U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB80-126980

Environmental Standards for Coal Conversion Processes. Volume I: Most Stringent, Federal, and Selected State Regulations

Pullman Kellogg, Houston, TX

Prepared for

Industrial Environmental Research Lab., Research Trianle Park, NC

Oct 79

United States
Environmental Protection
Agency

Industrial Environmental Research
Laboratory
Research Triangle Park NC 27711

EPA-600/7-79-231a
October 1979

PB80-126980

EPA

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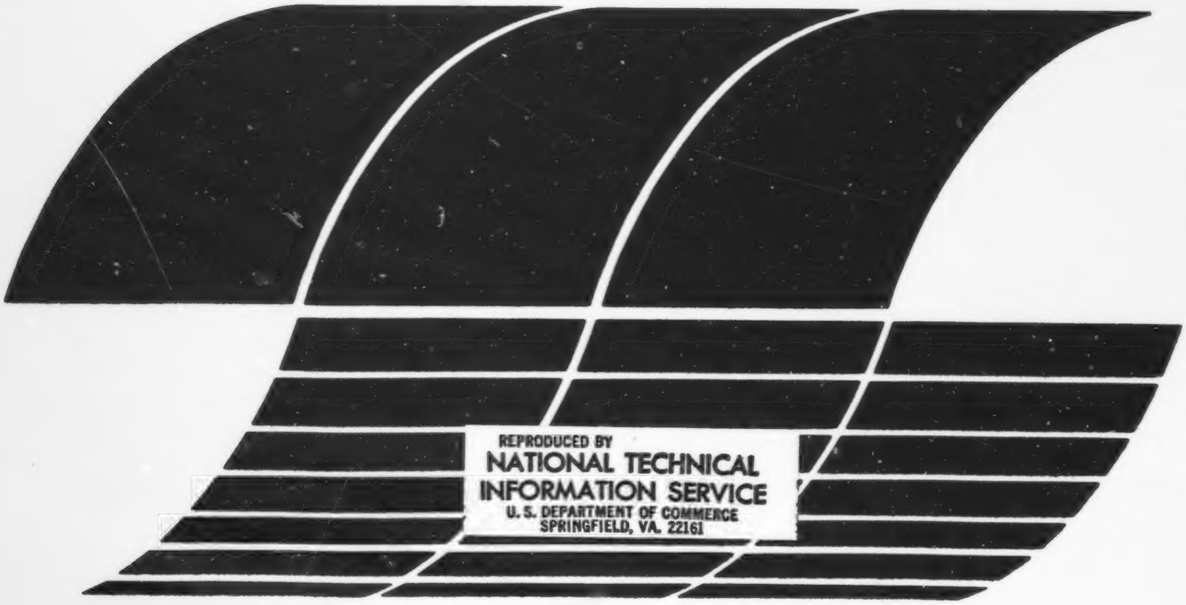
Interagency Energy/Environment R&D Program Report



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TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO.
EPA-600/7-79-231a

2.

3. RECIPIENT'S ACCESSION NO.
PB 80 126980

4. TITLE AND SUBTITLE
Environmental Standards for Coal Conversion Processes. Volume I. Most Stringent, Federal, and Selected State Regulations

5. REPORT DATE
October 1979

6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)
D.K. Webber and D.E. Whittaker

8. PERFORMING ORGANIZATION REPORT NO.

9. PERFORMING ORGANIZATION NAME AND ADDRESS

Pullman Kellogg
16200 Park Row, Industrial Park Ten
Houston, TX 77084

10. PROGRAM ELEMENT NO.
EHE623A

11. CONTRACT/GRANT NO.
68-02-2198

12. SPONSORING AGENCY NAME AND ADDRESS

EPA, Office of Research and Development
Industrial Environmental Research Laboratory
Research Triangle Park, NC 27711

13. TYPE OF REPORT AND PERIOD COVERED
Final; 2/77 - 1/79

14. SPONSORING AGENCY CODE
EPA/600/13

15. SUPPLEMENTARY NOTES IERL-RTP project officer is Robert A. McAllister, Mail Drop 61, 919/541-2160.

16. ABSTRACT

The report synopsizes existing and proposed environmental standards as a guide for evaluating the efficiency of available and developing technology for controlling liquid, gaseous, and solid wastes from coal conversion processes. Within the U.S., the Federal (including EPA) standards and guidelines for air, water, and solid wastes were gathered, together with standards for 22 states (selected for their potential in installing coal conversion facilities) and two regional commissions. Because environmental effects can cross national borders, standards and guidelines for Mexico, the Dominion of Canada, two Canadian provinces, and the International Joint Commission of U.S. and Canada were synopsized and added to the U.S. standards. All standards and guidelines were compared; from them the most stringent standards were summarized. This summary, reduced as far as possible to engineering terms, can guide in the design of coal conversion plants on the premise that if wastes from the conversion process steps are treated so that the final releases to the environment meet the criteria of most stringent standards, then conversion plants can be built anywhere in the U.S., Mexico, or Canada.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Pollution	Pollution Control	13B
Standards	Stationary Sources	14B
Coal Gasification	Coal Conversion	13H
Liquefaction		07D
Coal Preparation		08I

18. DISTRIBUTION STATEMENT **Release to Public**	19. SECURITY CLASS *(This Report)* **Unclassified**	21. NO. OF PAGES 268
	20. SECURITY CLASS *(This page)* **Unclassified**	22. PRICE A12 - A01

EPA Form 2220-1 (9-73)

EPA-600/7-79-231a

October 1979

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by

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Program Element No. EHE623A

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U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Research and Development
Washington, DC 20460

i.a

Foreword

The intent of this report is to provide those working in the engineering areas of multimedia environmental control an awareness of the types and breadth of regulations and criteria that have been and will be implemented. The information contains an engineering interpretation of some of the more stringent standards in the U. S., Canada, and Mexico. This is intended to aid process designers in their efforts to design environmentally improved facilities. The information is not intended to be a definitive summary or an exhaustive listing. Nor, is the report able to reflect accurately the current status of regulations because of on-going additions or changes.

The reader must constantly be aware that this text will have the above limitations, and due to summarization may not always reflect the true intent of specific regulations.

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ABSTRACT

Existing and proposed environmental standards have been gathered and synopsized to serve as a guide for evaluation of the efficiency of available and developing technology for control of liquid effluents, gaseous emissions and solid wastes from coal conversion processes. Within the United States, the Federal and EPA standards and guidelines for air, water and solid wastes were gathered, together with the standards for 22 states selected for their potential in installation of coal conversion facilities and the standards for two regional commissions. With a view toward the possibility of environmental effects crossing national borders, the standards and guidelines for Mexico, the Dominion of Canada, two Canadian provinces and the International Joint Commission of U.S. and Canada, were synopsized and added to the U.S. standards.

All of the standards and guidelines were compared and from them a summary of the most stringent of the standards was developed. This summarization, reduced as far as possible to engineering terms, can serve as a guide in the design of coal conversion plants on the premise that if the effluents, emissions and wastes from the conversion process steps are so treated that the final releases to the environment meet the criteria in the summary of most stringent standards, then the conversion plants can be built anywhere in the U.S., Mexico or Canada.

I. INTRODUCTION

A survey was made of present and currently proposed environmental restrictions relevant to contaminants in the effluents, emissions and wastes from coal conversion processes to serve as the measurement standard in evaluating available and developing control technology for such processes. The environmental restrictions set forth in Federal and state rules and regulations were reported together with selected international and regional regulations. The most stringent of the air and water regulations included herein have been summarized for convenience.

II. OBJECTIVES OF THE SURVEY

The prime objective of the survey was to assemble a single source reference document of applicable environmental regulations for use in considering both present control technology capabilities and necessary future technologies for controlling pollutants from the conversion of coal to gaseous or liquid fuel.

A second objective was to summarize the most stringent of the environmental regulations presented herein so that a single source of environmental requirements representing the most restrictive of present and proposed regulations would be available. A coal conversion facility built in the United States to meet the requirements in this most stringent summary would, by definition, meet the requirements of any individual state. The summary was by necessity limited primarily to those regulations of a quantitative (numerical) nature and did not include ordinances below the state jurisdictional level, since these were beyond the scope of the project. Special requirements introduced by individual states' permitting authorities were also beyond the scope of this project and were not included.

Another major objective was to provide an in-depth survey of the regulations of the selected states which had not been available previously to the extent presented in the survey. An example of the wide coverage of this survey is the inclusion of the U. S. EPA regulations applicable to Fluid Catalytic Cracking Units, Petroleum Refining Category, upon reasoning that giving a broad definition to Petroleum Refining, as some states do, makes such regulations potentially relevant to expected further on-site processing of coal liquefaction products.

III. BASIS FOR JURISDICTIONAL SELECTION

The first phase of the survey is concerned with federal and state environmental regulations. As such regulations are continually being amended they can only be reported current as of a given cut-off date. The cutoff date for the federal and state material in this report was 31 October 1977. The second phase supplements the first with a survey of regional and international regulations. Cutoff date for the second phase was 15 April 1978.

On the premise that the first phase activity should be as broad as possible, it was decided that expanding the material considered relevant would be preferable to restricting it. Consequently, whenever it appeared that a particular standard or regulation might have at least some present or potential relevance, it was included in the survey. This approach was also advantageous with respect to use of the survey by project personnel as a source of guidelines to demonstrate the type and degree of restrictions placed on environmental contaminants.

The approach taken in the first phase was to collect, organize, review and synopsize environmental laws, regulations, standards and other restrictions of probable relevance. The coverage of this survey has intentionally been made as broad as possible to present the widest and most divergent restrictions in effect at both the federal and state levels. No local jurisdictional environmental requirements below the state level were included in the survey. As the commercial coal conversion facilities which are the underlying subject matter of this project are all yet to be built, only regulations pertaining to new facilities, as opposed to existing facilities, have been considered and included.

To make the initial collection and review of environmental factors as meaningful as possible, it was decided that the selection of the states to be included in this environmental survey would be based on the reported availability of coal deposits within the various states. This basis was chosen because economic factors favor sites near coal deposits for possible coal conversion plant locations. Accordingly, the environmental laws, regulations and standards for 22 states were included with the federal restrictions in the first phase. The review of these state and federal requirements is broken down into the following three main areas:

Air Pollution Regulations
Water Pollution Standards
Solid Waste Requirements

A preliminary screening was carried out to determine most of the common contaminants normally present and to examine the state and federal regulations in view of these contaminants. The list of contaminants was extended as the work progressed.

It is noteworthy that, of all the states surveyed, only New Mexico has to date promulgated regulations which have specific applicability to fuel conversion facilities, and these regulations cover only the air pollution control area.

IV. JURISDICTIONAL SELECTION

In addition to the federal environmental restrictions and guidelines included within this survey, regulations for the following states were selected based on the state's potential* for future plant siting:

- Alabama
- Alaska
- Colorado
- Idaho
- Illinois
- Indiana
- Kansas
- Kentucky
- Missouri
- Montana
- New Mexico
- North Dakota
- Ohio
- Oklahoma
- Pennsylvania
- Tennessee
- Texas
- Utah
- Virginia
- Washington
- West Virginia
- Wyoming

In addition, the requirements as established by the U. S. Public Health Service Drinking Water Standards, 1962, and the Interim Primary Drinking Water Regulations were synopsized and included in the survey.

Although California was one of the states initially selected for inclusion within the survey, because of time limitations and California's unique method of establishing environmental restrictions, California regulations are not being included. California also ranks quite low among the selected states in reported coal deposits. North Dakota, which has both sizeable coal deposits and projected conversion plants, was substituted for California.

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*None of the New England states was included, although recently a coal conversion facility has been approved by Region I of the U.S. E.P.A. at Brayton Point Station in Massachusetts.

The review of federal and state standards was supplemented by a review of standards and guidelines established by the Delaware River Basin Commission, since the authority of this regional commission extends over geographical, rather than political, areas and therefore considers the area environment unconfined by artificial boundaries. It was found that the standards and guidelines adopted by the Susquehanna River Basin Commission are those of the states affected by the Commission.

Further consideration of the argument that environmental effects are not limited by political boundaries led to the inclusion in the survey of the standards and guidelines that have been established by Mexico and Canada. The Mexican regulations are federal actions, while in Canada both the Dominion and the provincial governments have enacted standards and guidelines. Therefore, Mexican federal standards, Dominion of Canada standards and guidelines, and the standards and guidelines of the provinces of Alberta and British Columbia became part of the survey. The two provinces were chosen because their boundaries are continguous with those of Montana, Idaho and Washington, where much of the U.S. western coal reserves are located.

Finally, the rules and guidelines established by U.S.-Canadian International Joint Commission were included in the survey, since these are primarily concerned with the Great Lakes and the St. Lawrence River areas and thus complete the regulatory coverage of the northern U.S. border.

V. METHOD OF INFORMATION ACQUISITION

The information required for the survey of environmental regulations was acquired in a series of steps:

A review of the applicable Code of Federal Regulations (CFR) to determine the relevant federal environmental rules and regulations.

A daily review of the Federal Register to determine applicable rules and regulations promulgated subsequent to the CFR edition, and additionally, any proposed rules, regulations or notices which would be of concern.

An initial request, prior to project inception, to the appropriate agencies of states selected requesting copies of their regulations. A request was also made that Pullman Kellogg be placed on mailing lists so as to be kept up-to-date on each state's activities in the environmental area.

A subsequent request to all selected states upon project inception for their current regulations to ensure that the latest information would be on hand. Those states which had indicated that they were either revising their regulations or considering doing so were again contacted to determine the status and, where possible, draft regulations were obtained, reviewed and included within the survey.

A review of Canadian regulations and guidelines, both Dominion and provincial, in Pullman Kellogg's domestic and Canadian files for rules pertaining to the environment.

A review of the actions of the International Joint Commission of the United States and Canada, for relevant environmental rules.

A review of the appropriate Mexican regulations in the law library of the University of Texas in Austin.

A limited environmental literature survey was conducted through NTIS and selected EPA data base searches, and various technical periodicals were received and reviewed for useful information concerning federal and/or state environmental restrictions.

VI. SPECIFIC ENVIRONMENTAL AREAS COVERED. COMMENTS

A. Air Emission Criteria

A review was conducted of the Federal EPA air emission regulations with designated emission source categories therein, of the selected state regulations, of the regional and the international regulations and guidelines. The potentially relevant air pollution standards were then synopsized for eventual inclusion in the survey report. As previously stated, the scope of this survey was purposely kept broad so as to provide the most comprehensive listing of existing and proposed regulations possible.

The following are comments generally applicable to a large majority of the jurisdictions surveyed:

> A permit is required for construction, modification or revision prior to commencement of the construction, modification or revision contemplated.
>
> Exceptions to the regulations are generally available for plant malfunction, startup and shutdown so long as specified reporting requirements are complied with.
>
> Dilution of any effluent or emission as a means of satisfying restrictions is prohibited.

Where there are several rules or standards applicable or more than one interpretation is possible, the most stringent should be applied.

In most jurisdictions, application for a variance from the established emission limits is possible, with discretionary approval authority in the jurisdiction's air pollution control agency.

Some states have specific geographical areas or air pollution control districts (sometimes heavily populated counties) which may have individual standards more stringent than the state-wide or "out-state" standards. No attempt was made to include these "localized" standards in this survey although a few of these regulations have been included for comparison.

Emission limitations applicable only to mobile sources were not considered as these types of regulations are not within the scope of the project.

The various regulations pertaining to monitoring of emissions were not included since these regulations are also beyond the scope of the review.

All the selected quantifiable standards as of the aforementioned cut-off dates were compared and the most stringent set of limitations was assembled; compliance with these limitations would presumably satisfy any criteria. The comparison of standards was undertaken as to numerical or quantified values only. Other regulations as found in the synopses would have to be considered in the design of proper control technology as well. These other regulations are primarily of a descriptive nature, sometimes of considerable length, and cannot readily be compared.

B. Water Effluent Limitations, Guidelines and Standards

The Federal EPA effluent limitations and guidelines for specific point source categories and water quality standards of the selected states were reviewed and synopsized. As in the air pollution control area, the range of water quality criteria surveyed was purposely kept broad to provide the most comprehensive listing of standards possible.

A majority of the states and other regulatory bodies have established water quality standards which are applicable, for the most part, to existing receiving waters of the state. The primary state mechanism for controlling effluents into receiving waters is enforcement of the conditions imposed by a required discharge permit.

An analysis was made to determine the most stringent standards whenever a numerical comparison was possible, which standards would then presumably satisfy any jurisdictional criteria. Again, it should be emphasized that this was a comparison of quantifiable standards only, and other regulations would have to be considered.

C. Solid Waste Disposal Requirements

The Federal Guidelines and the selected states' solid waste disposal requirements were reviewed and these guidelines and standards were synopsized. The same policy as to scope and relevance of standards was used in this area as in the water and air regulation areas.

The majority of the solid waste disposal requirements are much less definitive, with regard to establishing design requirements, than those criteria established within the air and water regulatory areas. The regulations tend to establish requirements directed more toward the operation of a disposal facility than to the design, such as adequate rodent control and proper compaction and cover for solid waste. Even though the operational criteria should be considered beyond the scope of this survey, some of these standards are presented for certain selected jurisdictions as guidelines, since these types of criteria are essentially the same from area to area. Also, many of the requirements are applicable to public authorities, such as municipalities, in their solid waste collection and disposal activities.

It should be expected that the regulatory activity in this area and especially with respect to hazardous wastes will continue to increase as a result of the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976, Title II Solid Waste Disposal (42 USC 6901 et seq.).

One provision generally common to the states reviewed allows for solid waste disposal on one's own property without a permit so long as no nuisance conditions are created.

Texas, one of the states surveyed, has issued Technical Guidelines for solid waste disposal and indicates that by following these guidelines all solid waste disposal requirements will be satisifed. These Technical Guidelines are available from the Texas Water Quality Board, which has responsibility in this area.

VII. SUMMARY OF MOST STRINGENT WATER QUALITY STANDARDS

Based on the Federal Standards, Selected States' Standards and the Regional and International Standards Covered in the Synopses

Notes:

1. The following compilation represents the most stringent criteria as established by the individual states, regions and countries considered for this project.

2. It must be emphasized that this compilation represents an analysis based on numerical considerations only; compliance with these criteria should, in all probability, allow construction at any location. However, engineering design based on the following criteria may result in over design, and this should be considered for any cost data developed that are based on the criteria.

I. GENERAL CRITERIA FOR RECEIVING WATERS

A. The following minimum water quality conditions should be applicable to all receiving waters, and such waters should be:

1. Free from substances that will cause the formation of putrescent or objectionable sludge or bottom deposits.

2. Free from floating debris or other floating materials.
   (Alternate: Free from floating debris or other floating materials in amounts to be unsightly or deleterious.)

3. Free from substances producing color, or odor to the water.
   (Alternate: Free from substances which produce color or odor in amounts to be deleterious or to such degree as to create a nuisance.)

4. Free from substances in amounts which would impart an unpalatable flavor to fish.

5. Free from substances which would be harmful or toxic to human, animal, plant, or aquatic life.
   (Alternate: Free from substances in amounts which would be harmful or toxic to human, animal, plant or aquatic life.)

6. Free from substances or conditions in concentrations which would produce undesirable aquatic life.
   (Alternate: Add to above, "Free from nutrients entering the waters in concentrations that create nuisance growths of aquatic weeds and algae.")

7. Free from toxic substances, heated liquids or any

other deleterious substances attributable to sewage industrial wastes or other wastes.
(Alternate: Add to above - in amounts which would affect public health or the desirability of the beneficial water use.)

B. Acid Mine Drainage Control Measures (Applicable to coal processing)

1. Surface and ground water shall be diverted where practicable to prevent entry or reduce the flow into and through mine workings.

2. Refuse from the mining and processing of coal shall be handled and disposed of in a manner so as to minimize the discharge of acid mine drainage to streams.

3. Discharge of acid mine drainage to streams shall be regulated to equalize the flow of daily accumulation throughout a 24 hour period.

II. SPECIFIC WATER QUALITY STANDARDS - RECEIVING WATERS

A. The following specific water quality criteria should apply to all waters:

Substance or Condition	Limitation
pH (range)	7.0 - 8.8 (Br. Columbia)
Temperature	≤ 1°C Rise (Canada-Federal) ≤ 60°F (Alaska and Washington) ≤ 85°F (North Dakota)
Dissolved Oxygen	≥ 9.5 mg/l (Fresh water) ≥ 7.0 mg/l (Marine water) ≥ 5.0 mg/l (probable average)
Color	None ≤ 15 Color Units (other criteria)
Turbidity	No Increase ≤ 10 JTU (probable average)
Total Coliform Bacteria	≤ 50/100 ml

MOST STRINGENT WATER QUALITY STANDARDS (CONT)

Substance or Condition (contd.)	Limitation (contd.)
Fecal Coliform Bacteria	$\leq$ 10/100 mg (Domestic water supply) $\leq$ 200/100 ml (Probable average)
Settleable Solids	None (Essentially free) $\leq$ 200 mg/l - (Pennsylvania)
Dissolved Solids	$\leq$ 100 mg/l (Br. Col., fresh water)
Oil and Grease	None $\leq$ 10 mg/l (Others)
Radioactivity	Gross beta - $\leq$ 15 pCi/l Strontium - $\leq$ 2 pCi/l Radium 226 - $\leq$ 1 pCi/l Alpha Emitters - 3 pCi/l
Odor and/or Taste	None $\leq$ 3 Threshold Odor Number (Probable average)
Total Dissolved Gas	$\leq$ 110% of Saturation
Hardness	$\leq$ 95 mg/l, max. 30 day avg. (Delaware River Basin Commission)
Persistent Organic Contaminants (harmful to human, animal, or aquatic life)	Substantially absent (North Dakota)
Toxic Substances	Persistant Toxicants - $\leq$ 1/2 of 96 hr TLM Non-Persistant Toxicants - $\leq$ 1/10 of 96 hr TLM
BODs (Deoxygenating Waste)	$\leq$ 30 mg/l

B. The following chemical pollutants should not exceed the specified concentrations at any time:

Constituent	Concentration
Alkalinity	20-100 mg/l (Del. R. Basin, tidal waters)
Alkyl Benzene Sulfonate (ABS)	$\leq$ 0.5 mg/l

MOST STRINGENT WATER QUALITY STANDARDS (CONT)

Constituent (contd.)	Concentration (contd.)
Ammonia (as N)	$\leq$ 0.02 mg/l (N. Dak; next value is $\leq$0.15 mg/l)
Arsenic	$\leq$ 0.01 mg/l
Asbestos	Lowest Practicable Level (IJC*)
Barium	$\leq$ 0.5 mg/l
Boron	$\leq$ 1.0 mg/l
Cadmium	$\leq$ 0.002 mg/l ($\leq$0.01 Probable
Chloride	$\leq$ 100 mg/l ($\leq$ 250 probable average)
Chlorine, residual	$\leq$ 0.002 mg/l (Proposed IJC) (Br. Col.: Below detectable limits)
Chromium (Hexavalent)	$\leq$ 0.05 mg/l
Cobalt	$\leq$ 1.0 mg/l
Copper	$\leq$ 0.005 mg/l (Proposed IJC; 0.10 probable average)
Cyanide	$\leq$ 0.005 mg/l
Fluoride	$\leq$1.0 mg/l
H S, undissociated	$\leq$0.002 mg/l (Proposed IJC)
Iron	$\leq$ 0.3 mg/l
Lead	$\leq$ 0.01 mg/l (Proposed IJC, Lake Superior; Ohio = $\leq$ 0.04)
Manganese	$\leq$ 0.05 mg/l
Mercury	$\leq$ 0.0002 mg/l (Proposed IJC)
Mercury in fish	$\leq$ 0.0005 mg/kg Wet wt. (Proposed IJC)
Nickel	$\leq$ 0.025 mg/l (Proposed IJC)
Nitrates	$\leq$ 10 mg/l
Phenols	$\leq$ 0.001 mg/l
Phosphorus	$\leq$ 0.05 mg/l
PCB (Polychlorinated biphenyl), total	$\leq$ 0.00 mg/l
Selenium	$\leq$ 0.005 mg/l ($\leq$ 0.01 probable average)
Silver	$\leq$ 0.0001 mg/l (Proposed IJC; $\leq$ 0.05 probable average)
Sulfate	$\leq$ 250 mg/l
Uranyl Ion	$\leq$ 5.0 mg/l
Zinc	$\leq$ 0.03 mg/l (Proposed IJC)

III. EFFLUENT STANDARDS

(When Not Specified Differently by Discharge Permit)

Except as otherwise noted, compliance with the numerical standards should be determined on the basis of 24-hour composite samples, and no contaminant shall exceed five times the numerical standards at any time or in any one sample.

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*IJC = International Joint Commission of United States and Canada

MOST STRINGENT WATER QUALITY STANDARDS (CONT)

A. No effluent shall contain the following:

1. Settleable Solids.
2. Floating debris.
3. Visible oil, grease, scum, or sludge solids.
4. Obvious color, odor and/or turbidity.
5. Fecal coliforms, concentration greater than 400/100 ml.

B. Additional contaminants, concentrations of which should not be exceeded in any effluent:

1\.

Constituent	Concentration
Aluminum	≤ 0.2 mg/l (Br. Col., one industry category)
Ammonia	≤ 0.5 mg/l (Br. Col, tentative)
Antimony	≤ 0.05 mg/l (Br. Col., one industry category)
Arsenic	≤ 0.05 mg/l
Barium	≤ 1.0 mg/l
Boron	≤ 1.0 mg/l
Cadmium	≤ 0.005 mg/l (Br. Col.)
Chlorate	50 mg/l (Br. Col, one industry category)
Chlorides	≤ 250 mg/l
Chlorine, residual	0.2 mg/l (Br. Col., one industry category)
Chromium (Hexavalent)	≤ 0.05 mg/l
Cobalt	0.1 mg/l (Br. Col., one industry category)
Copper	≤ 0.05 mg/l (Br. Col.)
Cyanide	≤ 0.02 mg/l
Fluoride	≤ 1.0 mg/l
Iron	≤ 0.3 mg/l
Lead	≤ 0.05 mg/l (Br. Col.)
Magnesium	150. mg/l (Br. Col., for fresh water; one industry category)
Manganese	≤ 0.05 mg/l (Br. Col)
Mercury	≤ 0.001 mg/l (Br. Col, tentative)
Molybdenum	0.50 mg/l (Br. Col, one industry category)
Nickel	≤ 0.2 mg/l (Br. Col)
Nitrites (N)	10.0 mg/l (Br. Col., for several industry categories)

MOST STRINGENT WATER QUALITY STANDARDS (CONT)

1.	Constituent	Concentration (Cont)
	Nitrogen	$\leq$ 2.5 mg/l - April - Oct. $\leq$ 4.0 mg/l at other times
	Phenols	$\leq$ 0.005 mg/l
	Phosphorus	$\leq$ 1.0 mg/l
	Selenium	$\leq$ 0.01 mg/l
	Silver	$\leq$ 0.05 mg/l
	Sulfate	$\leq$ 50 mg/l (Br. Col.)
	Sulfides and Mercaptans (S)	.011 mg/l (Br. Col., one industry category)
	Urea	1.0 mg/l (Br. Col., one industry category)
	Zinc (Ohio @ hardness < 80 mg/l as $CaCO_3$)	$\leq$ 0.075 mg/l (Usual $\leq$ 0.1)
2.	BOD	$\leq$ 30 mg/l (Deoxygenating Wastes)
3.	COD	$\leq$ 125 mg/l
4.	Temperature, max.	90°F (Br.Col., several industry categories)
5.	Turbidity	$\leq$ 10 J.T.U. (Br. Col., several industry categories)
6.	Solids: Total	$\leq$ 1500 mg/l (Br. Col., several industry categories)
	Dissolved (Total)	$\leq$ 1000 mg/l (Delaware R.B.C.)
	Suspended	$\leq$ 25 mg/l (Canada-Federal)
7.	Oil	$\leq$ 10 mg/l (Delaware R.B.C.)
8.	Odor	250 (threshold number) (Delaware R.B.C.)
9.	Persistent pesticides	Not to exceed 1/100 of TL50 value at 96 hours appropriate bioassay test (Delaware R.B.C.)
10.	Dissolved oxygen (nontidal streams)	Not to reduce dissolved oxygen content of receiving water by more than 5% (Delaware R.B.C.)

MOST STRINGENT WATER QUALITY STANDARDS (CONT)

Constituent	Concentration (Cont)
11. Toxicity	50% max. mortality in 96 hours appropriate bioassay test with 1:1 dilution (Delaware R.B.C.)
12. pH*	6.5-8.5 (Br. Col. - several industry categories)

IV. OTHER CRITERIA

A. Waste Treatment Ponds

Lagoons containing toxic substances or petroleum products must be lined. (Oklahoma)

B. Non-Degradation

Waters whose existing quality is better than the established standards shall not be lowered in quality.

C. Aesthetic values shall not be reduced by dissolved, suspended, floating or submerged matter so as to affect water usage.

*The pH limitation should not be subject to averaging and should be met at all times.

SUMMARY OF MOST STRINGENT AIR QUALITY STANDARDS

Based on the Federal Standards,
Selected States' Standards and the Regional and
International Standards Covered in the Synopses

General Notes and Comments on Application and Use

1. The main objective of this analysis was to present the most stringent of the air standards covered in the synopses which could be compared numerically. Additionally, some of the shorter narrative or design specification types of regulation representing most stringent (or unique) requirements are also included. Topics generally having narrative type regulations of considerable length were not included. General fugitive dust emissions and storage and handling of organic materials and organic solvents were among those falling in this category.

2. New Mexico is the only state covered to have promulgated air regulations specifically for "Gasification Plants." All of these regulations have been included in appropriate sections in this compilation. A number of other regulations are included within this compilation which are unique to a certain jurisdiction and therefore automatically the most stringent. Many of these are for non-criteria contaminants, however.

3. Not all of the jurisdictions used the same basis for their standards for given contaminants and sources. Where possible conversion of all similar standards to a common base for

4. The most general regulations with respect to geographical area or "out-state" regulations of the jurisdictions were synopsized and then compared. A few more stringent regulations for nonattainment areas (mainly heavily populated and industrialized counties) are shown in certain of the state regulations in addition to the "out-state" but were generally not included in the synopses.

5. Only regulations pertaining to new facilities were synopsized and compared as there are no existing commercial domestic fuel conversion plants of the type envisioned by this project.

6. Applicable Federal regulations found to be most stringent or as stringent as any jurisdiction covered are shown in this compilation in the appropriate place or category. Applicable

   but not most stringent Federal regulations are also shown but in parentheses for reference only. For easier reading the proposed Federal regulations for Stationary Gas Turbines have been placed together in one subsection of that title. They are newly proposed and the most stringent at present because none of the states covered have as yet promulgated regulations for such a source.

7. Prevention of Significant Deterioration (PSD) and Emission Offsets.
   The Clean Air Act Amendments of 1977 (enacted August 7, 1977) had considerable effect in the PSD area, which mainly provides the scheme for protecting areas with air quality cleaner than the minimum national ambient air standards.

SUMMARY OF MOST STRINGENT AIR QUALITY STANDARDS

Final regulation revisions for PSD were published in the Federal Register on June 19, 1978 at 43 FR 26380. State plans (SIP's) are required to reflect these requirements with revisions to be submitted to EPA by March 19, 1979. These regulations revise 40CFR Part 51 and Part 52 and are quite long and complex. As the publication date is after the April 15, 1978 cut-off date for source material for this project, a complete synopsis will not be made here of the PSD regulations as revised. However, a discussion of the effect and highlights of PSD follows due to the potential importance of these regulations relative to this project and the other regulations presented.

While PSD regulations apply primarily to areas meeting national ambient regulations for specified pollutants, Emission Offsets regulations apply primarily to dirty or nonattainment areas (areas not meeting ambient regulations). Because of the nature of the plants to be built relating to this project, it is assumed that attainment areas and thus PSD regulations are more relevant to the project. Two important basic requirements of Emission Offset regulations, where applicable, are: 1) lowest achievable emission rate (LAER) shall be attained, and 2) no net increase in emission shall result from an affected new or modified source. There are both significant similarities and differences in PSD and offset regulations.

A brief summary of the requirements set out in the PSD section of the 1977 Air Act Amendment (Section 165) follows:

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

> No major emitting facility (as defined in the Act) on which construction is commenced after August 7, 1977, may be constructed unless: 1) a permit has been issued setting forth emission limitations; 2) an air quality analysis has been conducted; 3) a public hearing has been held. (This is a new requirement which was not contained in earlier PSD regulations); 4) certain specified allowables (increments) are not exceeded; 5) best available control technology is applied; 6) the requirements for protection of pristine areas (Class I) have been met; 7) there has been an analysis of any air quality impacts projected for the area as a result of growth associated with the proposed facility; and 8) monitoring will be conducted to determine the effect of the facility's emissions on air quality.

PSD regulations at present apply to areas not exceeding National Ambient Air Quality Standards (NAAQS) for sulfur dioxide and particulates and establish allowable increases (incremental changes) for these pollutants in three area classifications above a defined baseline concentration. The allowable increases follow:

Pollutant	Maximum allowable increase (micrograms per cubic meter)
CLASS I	
Particulate matter:	
Annual geometric mean	5
24-hr maximum	10
Sulfur dioxide:	
Annual arithmetic mean	2
24-hr maximum	5
3-hr maximum	25

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

Pollutant	Maximum allowable Increase (micrograms per cubic meter)
CLASS II	
Particulate matter:	
Annual geometric mean	19
24-hr maximum	37
Sulfur dioxide:	
Annual arithmetic mean	20
24-hr maximum	91
3-hr maximum	512
CLASS III	
Particulate matter:	
Annual geometric mean	37
24-hr maximum	75
Sulfur dioxide:	
Annual arithmetic mean	40
24-hr maximum	182
3-hr maximum	700

Class I through III area classifications refer to geographical areas differentiated by the amount of incremental increases to be allowed in each. Class I increments permit only minor air quality deterioration; Class II increments, moderate deterioration; Class III increments, deterioration up to the secondary NAAQS.

Class I areas are often referred to as "pristine." Redesignation of lands from one classification to another by the states is allowed under some circumstances through specified procedures. Certain lands are now permanently in Class I. Class II increments have been changed and in some cases have become more restrictive; Class III increments now are specifically defined and procedures for reclassifying to Class III are more rigorous.

In the near future, PSD regulations will be extended to other pollutants for which NAAQS's are in effect (to be promulgated by August 8, 1979, and taking effect one year after promulgation).

It is now evident the required PSD air quality impact analysis will also apply in certain cases to nonattainment (dirty) areas. This is due to the possible effects of sources in nonattainment areas on air quality in clean areas. (The reverse can also be true so that the emission offset policy may have to be met by a clean area.)

A number of important and sometimes lengthy definitions are included in the current PSD regulations. For PSD purposes "major emitting source" under Section 169(1) includes 28 specified sources emitting, or having the potential to emit, 100 tons per year or more of any air pollutant. For those sources not specified only sources having emissions of more than 250 tons per year are subject to PSD requirements. "Baseline concentration" is defined as the ambient concentration level reflecting actual air quality as of August 7, 1977, minus any contribution from major stationary sources and major modifications on which construction commenced on or after January 6, 1975. Among other definitions are ones covering "major modifications," "potential to emit," "fugitive dust," "commence," "best available control technology," and "allowable emissions."

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

The two primary requirements that a PSD permit applicant must meet are:

1) Best available control technology, and

2) Not causing nor contributing to air pollution in excess of the maximum allowable increment or concentration for any pollutant more than one time per year.

Best available control technology is to be determined on a case-by-case basis, taking into account energy, environmental and economic impacts and other costs. At a minimum BACT must not result in emissions which would exceed the emissions allowed by new source performance standards under Section 111 or hazardous emission standards under Section 112 of the Air Act.

Of major concern is the likelihood of eventually consuming all available increments. The fuel conversions necessitated by the present energy situation in heavily industrialized areas will likely cause the sulfur dioxide and particulate increments to be exceeded, especially if all sources are counted against the increment. If offsetting reductions cannot be effected much of existing industry could be forced to curtail its operations and new sources could not be constructed.

The revised regulations follow the outline of the earlier regulations but, in general, are more comprehensive and restrictive.

8. The possible effects of certain general or catch-all provisions in the regulations covered must also be taken into account. Certain jurisdictions leave discretion in their air pollution agencies to lower specific numerical and other standards on the basis of "nuisance," for the "public welfare," because of specific health hazards, or where the application of best currently available control technology might reasonably dictate a more stringent standard. These would most often be applied on a case-by-case basis but could lower certain standards for an entire plant site under consideration. Because of the lack of specificity and wide variance in historical interpretation and application of such regulations among the jurisdictions, such regulations were not generally included in the stringency review. (Consideration of best currently available control technology with consideration of economic reasonableness and cost versus benefits is also a general requirement in the promulgation of regulations.) Typical examples of some of these general or catch-all provisions follow:

   a) Nuisance - Interference with Enjoyment of Life and Property. Compliance with the regulations herein notwithstanding, should it be found after public hearing that any specific emission source is, will be, or tends to be significantly injurious to human health or welfare, animal or plant life, or property, or is or will be unreasonably interfering with the enjoyment of life and property of any inhabitant of the state, or will interfere with the attainment or maintenance of any national ambient air standards, alternate standards or orders may be issued to require additional abatement or control of certain emissions as deemed necessary to effect the purposes of the Kansas enabling act. (Kansas)

b) Air Quality Degradation Regulated. In areas of present high air quality where measured or estimated ambient levels of controllable pollutants are below the levels specified by applicable standards any emission of pollutant to the ambient air must be shown to result in pollution levels within applicable ambient air standards and will be prohibited in any case unless shown to be controlled to afford the highest efficiencies and the lowest discharge rates that are reasonable and practicable as specified in [subsection B.2]. (Utah)

c) Non-degradation. The significant and avoidable deterioration of air quality in any part of an area where presently existing air quality is equal to or better than that required by Ohio ambient air quality standards shall be prohibited. (Ohio)

d) More stringent requirements. A greater degree of control may be required to prevent a health hazard or a local nuisance because of the particular properties of a specific organic compound. Determination of a health hazard will be based upon such factors as threshold limit values, presence of carcinogens, and other accepted health indicators. (Indiana)

e) "Best available control technology" shall be determined on a case-by-case basis considering the following: (Virginia)

1) The process, fuels and raw material available and to be employed in the facility involved;

2) The engineering aspects of the application of various types of control techniques which have been adequately demonstrated;

3) Process and fuel changes;

4) The respective costs of application of all such control techniques, process changes, alternative fuels, etc.;

5) Any applicable emission standards; and

6) Location and siting considerations.

f) Best currently available control technology (BCACT). Air contaminant sources shall have installed and utilize the best currently available equipment and control technology for limiting emissions of gaseous air contaminants. (Tennessee)

g) Particulate Emissions - General Process Standards: Particulate non-attainment counties. In any county where one or more sources are emitting particulates at rates in conformity with applicable maximum emission rates and the ambient air quality standard for particulate matter is being exceeded, the Board shall set an appropriate emission standard for each source contributing to the particulate matter in the ambient air of the county at such value as the Board may deem necessary to achieve the desired air quality. (Tennessee)

h) Diluting and Concealing Emissions. The installation or use of any device, contrivance or operational schedule which, without resulting in reduction of the total amount of air contaminant released to the atmosphere, shall dilute or conceal an emission from a source is prohibited. (Wyoming)

9. Specific limitations and shortcomings in presenting this type of analysis in a conveniently brief manner are discussed in the last item of this section. The standards presented in this survey were condensed from generally lengthy rules and regulations. Numerical standards seldom stand alone and are generally clarified, modified, and limited by accompanying definitions, exceptions, calculation procedures and instructions, and other narrative forming the context in which they are found. The synopses herein attempted to retain the key points of such narrative but considerably less could be included in a reasonably brief stringency survey. Therefore, this survey may be used as a guide and convenient reference but not as a complete substitute for the synopses, the regulations, and other auxiliary sources such as court or agency opinions for in-depth regulatory applications.

10. Limitations and precautions in application. The following points indicate some of the most significicient areas of potential difficulty or inconsistency with respect to the application of this most stringent air standards survey. The full implication of several of the points will probably only be apparent to those who now have or formerly have had extensive involvement in the practical application of air regulations.

    a) Although fairly consistent, the rules for adding like facility rates or capacities within a given plant before calculating standards vary somewhat among the various jurisdictions and can lead to determination of different values for calculated standards. These rules are not always clearly spelled out in the written regulations and are often subject to or controlled by custom, board discretion, and court or agency rulings within a given jurisdiction. When necessary to add all units of a given source category within a plant before determination of the standard (probably the most common procedural method) smaller allowable emission values will generally result because percentage limitations on contaminants always decrease as capacity or stream rate increases where variable standards are specified.

    b) As the most stringent regulations compiled are an artificial body of rules, no general system exists dictating controlling relationships between these regulations where conflict, overlapping, or the like might exist. Such a system does generally exist for any single jurisdiction and for the Federal and other jurisdictional regulations but these systems vary somewhat and thus would produce some differences upon application.

c) Some of the most stringent standards are presented by tables with standards at several specific stream rates or plant capacity levels. This was necessary where the jurisdictions used a mixture of constants and/or formulae to cover the standards over defined ranges, generally in terms of certain stream rates or other plant capacity indicating factors. To compare these for stringency it was necessary to solve any applicable formulae at some stream rate or plant capacity level within the relevant range. The fuel conversion plants under consideration are generally of very large throughputs and thus one or more points representing realistically high rates or capacities were among those selected in most cases. Conversely, some included units or streams in the plants could be rather small and so required other points to be determined representing rather small streams or capacities. A wide variety of plants and processes is within the project scope, and this introduces considerable potential variation in flow rates and sizes of specific units or facilities within the over-all plants.

11. Referring to the standards requiring tabular presentation as mentioned in 10.c) above, the most stringent standards could only reasonably be shown for a limited number of selected points. Interpolation between these selected points would almost never be proper because the points used could represent either constants or solutions to one or more formulae

at relevent capacities or rates. The synopses or the complete regulations would thus have to be referred to for intermediate standards evaluation, and in some cases care might have to be taken to determine which jurisdiction's regulation was most stringent at the new point in question.

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

I. Nitrogen Oxides (NO_x, expressed as NO_2).

A. Fuel Burning Equipment

Facilities $\geq$ 250 MM Btu/hr heat input*	
Gas fired	0.2 lb/MM Btu (Federal, most states)
Liquid (oil) fired	0.3 lb/MM Btu (Federal, most states)
Solid (coal) fired	0.45 lb/MM Btu (N.M.; Federal is 0.7 lb/MM Btu)
Facilities <250 MM Btu/hr heat input	
Any Fossil Fuel	Best Available Control Technology (Ohio)
Any size facility	
Gas Fired	0.2 lb/MM Btu (Wyoming)
Solid (coal) fired	0.7 lb/MM Btu (Wyoming)
Facilities $\geq$ 1 MM Btu/hr heat input	
Liquid (oil) fired	0.3 lb/MM Btu (Wyoming)
Facilities < 1 MM Btu/hr heat input	
Liquid (oil) fired	0.6 lb/MM Btu (Wyoming)

Combined Fuel Firing (No Federal Standard but several states have a formula covering, Colorado's is shown below)

$$E = (0.2X+0.3Y+0.7Z)/(X+Y+Z)$$

Where: X is the % of total heat input from gaseous fossil fuel;
Y is the % of total heat input from liquid fossil fuel; and

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*Idaho incorporates the Federal standards here except that its Dept. determines on a case-by-case basis whether a stricter standard should be adopted after application of the best currently available control technology with reasons to be stated with the standard.

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

Z is the % of the total heat input from solid fossil fuel.

II. Visible Emissions
  - A. Processes
    20% Opacity (#1 on Ringelmann Chart), (Kentucky)
  - B. General (Any Source)
    20% Opacity (#1 on Ringelmann Chart), (Alabama and many states)
    for ≥ 100,000 acfm flue gas rate: 15% Opacity (Texas) ,
  - C. Fuel Burning Equipment
    10% Opacity (#0.5 on Ringelmann Chart), (West Virginia Federal - 20% Opacity)
  - D. Incinerators
    10% Opacity (#0.5 on Ringelmann Chart), (Montana)
  - E. Coal Preparation Plants
    Thermal Dryers - 20% Opacity, (Federal)
    Pneumatic Coal Cleaning Equipment: 10% Opacity (Federal)
  - F. Petroleum Refineries
    From fluid catalytic cracking unit catalyst regenerator or fluid catalytic cracking unit incinerator - waste heat boiler: 30% Opacity (Federal)

III. Particulates
  - A. Processes
    1. Standards Based on Process Weight Rate

Process Weight Rate, lb/hr	Emission Standard, lb/hr
2.5 MM	54.2 (Alabama, others)
1.0 MM	46.8 (Alabama, others)
0.1 MM	20.5 (Illinois)
0.05 MM	14.2 (Illinois)

2. Standards Based on Stack Exhaust Gas Rate

Stack Exhaust Gas Rate, DSCFM	Concentration Standard, gr/DSCF
1 MM	0.02 (Pa.)
0.3 MM	0.02 (Pa.)
0.2 MM	0.03 (Pa.)
0.1 MM	0.04 (Pa.)

3. Process emitting 100 T or more of particulates annually based on 0 control (excluding combustion products of fuel oil, LPG, or natural gas).

   85% control of emissions (based on 0 control with source at maximum operating capacity). (Utah).

B. Petroleum Refineries

From fluid catalytic cracking unit catalyst regenerator or fluid catalytic cracking unit incinerator - waste heat boiler -

1.0 lb/1000 lb of coke burn-off (Federal), (incrementally higher emission rates are allowed for heat input attributable to auxiliary liquid or solid fossil fuels).

C. Gasification Plants - General (Certain boilers and coal briquet forming facilities within these plants are covered later in subsection III.E.).

Standard: 0.03 gr/scf exit gas

D. Fuel Burning Equipment

1. Standards Based on Heat Input Capacity.

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

(Fuels as designated)

Coal:	>250 MM Btu/hr in	0.05 lb/MM Btu (H.H.V.) (New Mexico); and 0.02 lb/MM Btu (H.H.V.), for particulates 2 microns equivalent aerodynamic diameter or less (New Mexico)
	<250 MM Btu/hr in	0.1 lb/MM Btu (Illinois)
Oil:	>114 MM	0.005 (New Mexico)
	<114 MM	0.1 (Illinois)
Gas:	>2500 MM	0.1 (Texas)

Combinations Fuels: $E = S_s H_s + 0.10\ H_1$ (Illinois)

where: S_s is applicable solid fuel particulate emission, lb/MM Btu actual heat input;

H_s is actual heat input from solid fuel, MM Btu/hr;

H_1 is actual heat input from liquid fuel, MM Btu/hr

(Any Fuel - Specific Fuels are not Designated)

Heat Input, Btu/hr	Standard, lb/MM Btu
10 MMM	0.1 (Federal, Okla.)
5 MMM	0.1 (Federal, several states)
500 MM	0.1 (Federal, several states)
50 MM	0.1 (Wyoming)
5 MM	0.4 (Ohio, other states)

2. Standards Based on Exhaust Gas Rate

Any fuel except coal or municipal waste: 0.05 gr/SCF (Alaska)

Coal or municipal waste: 0.1 gr/SCF (Alaska)

E. Gasification Plants (Designated Facilities and Fugitive Dust as per Respective Subsection Headings). (New Mexico)

1. Gas burning boilers (in conjunction with gasification plant)

   Standard: 0.03 lb/MM Btu heat input (L.H.V.)

2. Boilers firing more than one fuel (in conjunction with gasification plant).

   Formula for Standard:

   $$E_T = E_o Q_o + E_c Q_c + E_g Q_g$$

   where E_T is the total allowed emission in pounds per given period of time;

   E_o is the allowed emission from oil in lb/MM Btu's;

   E_c is the allowed emission from coal in lb/MM Btu's;

   E_g is the allowed emission from gas in lb/MM Btu's;

   Q_o is the heat released by the oil based on the higher heating value in Btu's per period of time;

   Q_c is the heat released by the coal based on the higher heating value in Btu's per period of time;

   Q_g is the heat released by the gas based on the lower heating value in Btu's per period of time.

   Additionally, maximum emissions of particulates two microns or less (equivalent aerodynamic diameter) are limited by:

   $$E_f = 0.40\ E_c\ (Q_o + Q_c + Q_g)$$

where E_f is maximum emissions in lb/given time period, and other terms are as defined in 2.a) above.

3. Coal briquet forming facilities

   Standard: 0.03 gr/SCF exit gas (with particulate emissions limited to stack outlets within technical feasibility).

4. Stack Design. All particulate emissions are to be through stacks at least ten diameters in length with adequate platforms and parts for sampling.

5. Fugitive Dust. No material shall be handled, transported, stored or disposed of and no building or road shall be used, constructed, altered or demolished without taking reasonable precautions to prevent particulates from becoming airborne.

F. Coal Preparation, Handling, and Mining

1. Standard for any thermal dryer: 0.031 gr/DSCF effluent gas (Federal)

2. Standard for any pneumatic coal cleaning equipment: 0.018 gr/DSCF effluent gas (Federal)

3. Coal preparation plants. All crushers, conveyors, screens, cleaners, hoppers, and chutes, which are designed for continuous transportation or preparation of coal shall be equipped with hoods, shields, or sprays where reasonably necessary to prevent airborne particulate matter. (New Mexico)

4. Coal mines-roads. Main coal haulage roads shall be sprayed or otherwise treated where reasonably necessary to prevent airborne particulate matter. (New Mexico)

G. Incinerators

1. Standards Based on Refuse Charge Rate

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

Refuse Charge Rate, lb/hr	Standard, gr/SCF Exahaust Gas (vol. corrected to 12% CO_2)
60,000	0.05 (Illinois)
5,000	0.08 (Federal, Illinois)
1,000	0.10 (Montana, others)
500	0.10 (Montana, others)
100	0.10 (Montana, others)

Refuse Charge Rate, lb/hr	Standard, lb/100 lb charged
500 (and higher rates)	0.10 (Ohio)
100	0.20 (Ohio)

2. Emissions with an excess of 100 ppm total carbonyls in the exhaust gases are prohibited. Operation shall only be during daylight hours unless permission for other operation is obtained from the Department. (Washington)

IV. Carbon Monoxide
  A. General Sources
    1. Emissions shall be limited so as to prevent ambient air standards for CO from being exceeded. Appropriate means are use of a direct flame afterburner or other Division approved means of equal effectiveness. (Wyoming)
    2. All sources of CO shall control CO emissions by use of the best currently available control technology (BCACT, Ohio).
  B. Petroleum Refineries or Processes

1. Any petroleum processing facility.
    a) A waste gas stream shall be burned in a direct flame afterburner or CO boiler so that a concentration of no more than 200 ppm (vol., corrected to 50% excess air) CO is emitted or shall be treated by other equivalent and Agency approved control technology. (Catalyst regenerators of fluidized catalytic converters equipped for in situ combustion of CO may emit CO concentrations up to 350 ppm corrected to 50% excess air. (Illinois) (The Federal standard and that of many states is 0.050% (vol.) in effluent gas.)
    b) Waste gas streams with CO from any catalyst regeneration of a petroleum cracking system, petroleum fluid coker, or any other petroleum process must be burned at 1300°F for 0.3 sec or longer in a direct-flame afterburner or boiler with indicating pyrometer. (Alabama, Ohio)
2. Any petroleum process.
   Emissions shall be reduced by complete secondary combustion (93% removal of CO or more) of the waste gas stream. (Oklahoma)

C. Fuel Burning Equipment
1. Facilities with >10 MM Btu/hr actual heat input.
   200 ppm CO (corrected to 50% excess air). (Illinois)
2. Effluent streams with CO shall be burned in a direct-flame afterburner or boiler or controlled by other Board approved means. (Indiana)

D. Incinerators
  1. Any incinerator
     500 ppm (corrected to 50% excess air). (Illinois)
  2. Any effluent streams with CO shall be burned in a direct-flame afterburner or boiler or controlled by other Board approved means. (Indiana)

V. Odors
  A. Odors from H_2S or Mercaptans.
  Emissions containing H_2S or mercaptans shall be incinerated at 1200°F or higher for at least 0.3 sec before discharge to the atmosphere or treated by alternate means shown to the Department to be at least as effective. (Pennsylvania)
  B. Any source (some of the standards below represent similar requirements stated in slightly different ways by different states).
  - Malodorous air from any source whatsoever, regardless of compliance with other odor standards [in these regulations] shall not be emitted such that any odor is detectable beyond the property line of such source. (Pennsylvania)
  - Best available control technology as approved by the Board shall be used to limit odorous emissions from any odor emitting source. No odor, except for accidental or other infrequent emissions, that would be objectionable to a person of ordinary sensibility shall be emitted from a facility. (Virginia)
  - The discharge of gases, vapors, or odors beyond the property line of an odor source so that a public nuisance is created is prohibited. (Montana)
  - No odor shall be detectable from a sample taken at the property line of an odor source after dilution with up to seven volumes of odor free air as determined by the

Barneby-Cheney Co.'s centometer or equivalent and approved method. Effective odor control devices or systems shall be installed and operated such that odors in excess of the above are not created in areas adjacent to the source property line. (Wyoming; Missouri requires two separate tests not less than 15 minutes apart each hour.)

- Handling and storage. Odor producing materials shall be stored and handled so that accompanying odors do not create a public muisance; accumulation of such quantities of these materials as to permit their escape or spillage shall be prohibited. (Montana)

C. Incinerators

1. Incinerators, including all associated equipment and grounds, shall be designed and operated in such manner as necessary to prevent emission of objectionable odors. (Ohio, Alabama, Missouri)

VI. Sulfur Dioxide and Sulfur

A. Fuel Burning Equipment - Sulfur Emissions Standards (Kansas)

$\geq$250 MM Btu/hr: 1.5 lb/MM Btu

B. Fuel Burning Equipment - SO_2 Standards

1. Specific fuels

Gas fired - SO_2 Standard: 0.16 lb/MM Btu L.H.V. (N.M. - Gasification Plants)

Residual oil fired* - SO_2 Standard:

440 ppm (vol.) SO_2 emissions concentration (Texas)

>115 MM Btu/hr: 0.34 lb/MM Btu (N.M.; Federal = 0.8 lb/MM Btu)

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*(At very high rates the Kentucky SO_2 standard formula will be more stringent. This formula for oil fired equipment is: $Y = 7.7223X^{-0.4106}$.)

Distillate fuel oil fired - SO_2 Standard:
>250 MM Btu/hr: 0.3 lb/MM Btu (Illinois)
Coal fired - SO_2 Standard: >250 MM Btu/hr: 0.2 lb.MM Btu (Wyoming; Federal = 1.2 lb/MM Btu)
<250 MM Btu/hr: 1.2 lb/MM Btu (Oklahoma)

2. Any fuel
   SO_2 Standard: 1.0 lb/MM Btu (Ohio); also
   500 ppm (vol.)(Alaska)
3. Combination fuel fired. Several states have heat input dependent formulae for the SO_2 standard for combination fuels.

$$E = (0.8Y+1.2Z)/(Y+Z)$$

where: E is the maximum rate of emission, lb/MM Btu heat input (2 hr. avg.);
Y is the % of total heat input from liquid fuel; and
E is the % of total heat input from solid fuel

C. General Standards
   1. SO_2 Standards:
      250 ppm (vol.) (British Columbia)
      1000 lb/hr in exit gas (Mo.). Exceptions (Mo.): where SO_2 concentrations in ambient air at occupied places beyond emitting source premises don't exceed 0.25 ppm (vol.), 1 hr. avg., max. over once in a 4 day period; or
      0.07 ppm (vol.), 24 hr. avg., max. over once in a 90 day period.
2. Net SO_2 ground level concentrations (Texas)
   0.4 ppm, 30 min. avg., (allows exemptions when source meets Federal New Source Performance Standards, utilizes best available control technology, and doesn't cause or

contribute to SO_2 primary and secondary ambient standards being exceeded in area. Several non-attainment counties have a 0.28 ppm, 30 min. average maximum).

D. Processes

1. Gasification Plants - S emissions (New Mexico):
   .008 lb/MM Btu heat input (HHV) in feed to plant
2. Sources other than fuel burning equipment and petroleum refineries - SO_2 Standards based on effluent concentrations.
   500 ppm (vol.) - current (Colo.)
   500 ppm (vol.) and emissions of not greater than 5T SO_2 per day from any process unit (applies only to SO_2 concentrations of 150 ppm (vol.) or more - effective on 1/1/85 and applies to new sources after 1/1/80 (Colorado)
3. Process with >250 MM Btu/hr heat input
   $E_p = 19.5P^{0.67}$ (Indiana)
   where $E_p = SO_2$ in lb/hr
   P = total process weight input capacity in T/hr
   at $P = 500$ T/hr, $E_p = 1254$ lb/hr
4. Ground level concentrations limits (if emitting >10 lb/hr SO_2) (Indiana):

$$C_{max} = \frac{40\ S_p P^{0.75} n^{0.25}}{a h_s}$$

   where $C_{max.}$ = max. hourly ground level conc. with respect to distance and at the "critical wind speed for level terrain" resulting from the point source. $C_{max.}$ shall not exceed 900 ug/m^3 in areas where ambient air quality is better than applicable SO_2 secondary ambient air quality standards.

5. Regardless of the specific emission standard applicable in this regulation, emission sources shall utilize the

best available control technology as deemed appropriate by the Board. (Tennessee)

E. Sulfur Recovery Plants

1. SO_2 Standards - basis of lbs/lb S entering any size facility: .01 lb/lb S. (Ohio, Okla.)
2. SO_2 Standards - basis of lb/hr SO_2 allowed
   Texas formulae:
   >4000 SCFM effluent gas rate
   $E = 0.614\ q^{0.8042}$
   $\leq$ 4000 SCFM effluent gas rate
   $E = 123.4 + 0.091\ q$ (q = effluent gas rate; SCFM)
   Texas Standard at Rate Shown:
   @ 1 MM SCFM, E = 41,055 lb/hr
   @.237 MM SCFM, E = 6449 lb/hr
   @ 3 M SCFM, E = 396.4 lb/hr
3. S. recovery plants in conjunction with natural gas processing: 100 lb SO_2/hr, max. 2 hr. avg. (Okla.)
4. Also see VII D.5. - H_2S from sulfur recovery plants in conjunction with petroleum processing facilities. (New Mexico) That provision will generally be more stringent where applicable.

F. Sulfuric Acid Producing Facilities (Wyoming)
Processes producing H_2SO_4 by the contact method burning elemental sulfur, hydrogen sulfide, organic sulfides, mercaptans, or acid sludge shall limit SO_2 emissions in all effluent streams to:
not over 4 lb/T of acid produced, max. 2 hr. avg.

G. Petroleum Processing Facilities

1. Definition. "Plant processes" includes but is not limited to hydrogenation sweetening units, hydro-

cracking units, fuel burning equipment including flares and incinerators, sweetening system regeneration units, sour water strippers, and similar sulfur releasing systems. Catalyst cracking regeneration units other than hydrocracking units, boilers, or process heaters are not included if total emissions from them are less than 2.5T of S per day. (New Mexico)

2. Refinery plant processes (New Mexico)
   avg. S released per day >5T<30 T:
   .10 lb of S/lb S released in plant processes
   avg. S released per day $\geq$30 T:
   .02 lb of S/lb of S released in plant processes
3. Fuel-gas burning equipment (New Mexico)
   lb of S in effluent gas not to exceed a quantity equivalent to an S content of fuel gas entering of 10 gr/100 SCF of gas.
4. Fuel gas combustion devices in petroleum refineries (Federal).
   Fuel gas containing H_2S in excess of 0.10 gr/DSCF shall not be burned in any fuel gas combustion device. However, the combustion exhaust gases may alternately be treated so that the SO_2 emissions control is the equivalent with respect to SO_2 of compliance with this H_2S content regulation.
5. Alabama regulations, which cover petroleum facilities handling natural or refinery (process) gas containing more than 0.10 gr H_2S/SCF of gas could be more stringent in certain isolated cases. These

regulations have an increment correction factor (additional SO_2 emission allowed) dependent on mol % H_2S in the dry acid gas up to 60 mol % H_2S. Alabama also has a requirement that a demonstration be made that the SO_2 emitted will not cause or contribute to non-attainment of any primary or secondary ambient air standards. For reference only the basic uncorrected Alabama regulations are as follows:

>10 Lt ≤ 50 LT available S per day:
    560 lb/hr
>50 Lt $\leq$ 100 LT available S per day:
    0.10 lbs SO_2/lb of S processed
>100 LT available S per day:
    0.08 lbs SO_2/lb S processed

H. Standards for Sulfur Content of Fuels (as S). (Montana)
   1. Liquid or Solid Fuel
      a) Max. S in Fuel: 1 lb/MM Btu fired
   2. Gaseous Fuels
      a) Max. S in Fuel (calculated as H_2S):
         50 gr/100 SCF of fuel
   3. Exceptions and exemptions to the standards in 1. and 2. are listed.

VII. Hydrogen Sulfide
   A. Any source-general (Texas)
      1. Max. net ground level concentration.
         a) Where residential, business or commercial property downwind of H_2S source is affected
            0.08 ppm, 30 min. avg.
         b) Where H_2S source affects only downwind property used for other than the purposes listed in 1.a) above (such as industrial, vacant tracts, or range lands not normally inhabited.)
            0.12 ppm, 30 min. avg.

MOST STRINGENT AIR QUALITY STANDARDS

B. Gasification Plants (New Mexico)

1. 100 ppm (vol.) in effluent gas, to any combination of H_2S, carbon disulfide, and carbon oxysulfide, and
2. 10 ppm (vol.) in effluent gas, max. H_2S component in combined effluent gas.

C. Processes

1. H_2S emission rate (or rate to any combustion device) (Kansas):

   10 gr/100 ft^3 of gas emitted (or fed to combustion device); except combustion of fuels where the gaseous products are used as other process raw materials.
2. Limits on H_2S in ambient air in inhabited areas beyond the source premises where concentrations are attributable to such source. (Missouri)

   0.03 ppm (vol.), 30 min. avg., not more than twice in any 5 consecutive days

   0.05 ppm (vol.), 30 min. avg., not more than twice per year
3. Effluent gas from H_2S process sources shall be vented, incinerated, flared or otherwise disposed of so that ambient H_2S and SO_2 standards are not exceeded. (Wyoming)

D. Petroleum Processing Facilities

1. Fuel combustion devices (Federal):

   Fuel gas containing H_2S in excess of 0.10 gr/DSCF gas shall not be burned. The exhaust gases may alternatively be treated so that equivalent SO_2 emission control is obtained upon such showing to the satisfaction of the EPA Administrator.

   Exceptions. Flaring of process upset gas or of the process or fuel gas from relief valve leakage is exempt from the above.

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

2. Maximum H_2S concentration in refinery process gases emitted or combusted: 150 ppm (Alabama)
3. Ground level H_2S concentration beyond source premises for facilities handling natural or refinery (process) gas containing more than 0.10 gr H_2S/SCF. (Alabama)

   Stream shall be burned to maintain a 20 ppb concentration, averaged over a 30 min. period. (Determination of such concentration from waste gas or emergency flaring to assume only 75% of heat of combustion is used to heat products of combustion).
4. H_2S emissions shall be controlled by removal of H_2S from exhaust gas or H_2S oxidation to SO_2 in a system insuring complete oxidation of H_2S at all times. H_2S limits in either type of control system shall be: (Oklahoma)

   0.3 lb/hr of H_2S, 2 hr. avg.; and 95% removal of H_2S in exhaust gas Any oxidation system shall utilize a stack at least 50 feet in height. Such system shall not be allowed to emit over 100 lb/hr of SO_x (expressed as SO_2 2 hr. avg.) unless there is a prior removal step meeting Oklahoma SO_x limitations.
5. H_2S from petroleum processing facilities including sulfur recovery plants in conjunction with such facilities (New Mexico). Either:
   a) 10 ppm (vol.) max. in effluent gas; or
   b) the effluent gas shall be passed through suitable equipment to oxidize the H_2S to SO_2
   c) Flares which may flare gas with over 10 ppm of H_2S shall utilize alarms to signal non-combustion of the gas.

6. Claus Sulfur Recovery Plants. No discharge shall be allowed of any gases to the atmosphere containing in excess of:
    a) 0.025% (vol.) of SO_2 at 0.0% O_2, dry basis, where emissions are controlled by an oxidation control system, or a reduction control system followed by incineration, or
    b) 0.030% (vol.) of reduced sulfur compounds and 0.001% (vol.) of H_2S calculated as SO_2, at 0.0% O_2 on a dry basis, if emissions are controlled by a reduction control system not followed by incineration.

VIII. Sulfur Content of Fuels

A. Maximum Sulfur Content (wt % S or as noted)

Any fuel oil	1.5% (Utah)
Distillate fuel oil	
#1	0.3% (Idaho)
#2	0.5% (Idaho)
Coal (Solid)	1.0% (Idaho) 1 lb S/MM Btu input (Montana)*
Gaseous fuel	50 gr (as H_2S)/100 SCF of fuel in (Montana)*

IX. H_2SO_4, Sulfuric Acid Mist, SO_3

A. Emissions of H_2SO_4 or SO_3 (or combination)

1. 35 mg (as H_2SO_4)/m^3 of effluent gas (Missouri)

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*Montana allows higher sulfur content fuels with proper approval where such fuels are mixed with lower sulfur-containing fuels so that the mixture doesn't exceed the standard. Montana also allows SO_2 emission control in the alternative if such control will be equivalent in terms of sulfur emitted (in lb/hr).

2. Process sources not including sulfuric acid manufacturing sources (Illinois)
   equivalent sulfuric acid usage <1300 tons per year (100% acid basis)
      0.10 lb in any 1 hr period
   equivalent sulfuric acid usage $\geq$ 1300 tons per year) (100% acid basis)
      0.50 lb /T of H_2SO_4 used

B. Concentration of H_2SO_4 or SO_3 (or combination) in Ambient Air in Inhabited Areas beyond Source Premises (Missouri)
   0.03 mg (as H_2SO_4)/m^3, 30 min avg., not over once in 48 hrs.
   0.01 mg (as H_2SO_4)/m^3, 24 hr avg., not over once in 90 days
   100 ug/m^3 of air (std) at any time

C. Net Ground Level Concentration (Texas)
   15 ug/m^3 of air (std), 24 hr avg.
   50 ug/m^3 of air (std), 1 hr avg., measured more than once in any 24 hr period.

X. Other Miscellaneous Sulfur Compounds

A. Mercaptans

1. Petroleum processing facilities:
   Emissions of mercaptans shall be either: not greater than 0.25 lb/hr (total mercaptans), or controlled by passing through a combustion device which will achieve complete combustion or any other equally efficient device for control of mercaptans. (New Mexico)

XI. Gasification Plants - Other Contaminants

A. HCN Standard.
   10 ppm (vol.) in effluent gas (New Mexico)

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

B. NH_3 Standard.

25 ppm (vol.) in effluent gas (New Mexico)
Additionally any stationary tanks holding NH_3 shall be:

A pressure tank capable of maintaining working pressures sufficient to prevent loss of NH_3 to the atmosphere, or

Equipped with other equally effective control equipment to prevent loss of NH_3 to the atmosphere. (New Mexico)

C. Hydrogen Chloride/Hydrochloric Acid Standard.

5 ppm (vol.), any combination of hydrogen chloride and hydrochloric acid in effluent gas. (New Mexico)

XII. Hazardous Air Pollutants

A. Definitions. "Hazardous air pollutants" means an air pollutant to which no ambient air quality standard is applicable and which in the judgement of the Administrator causes or contributes to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness. (Federal)

B. Mercury (Federal)

1. Definition. "Mercury" means the element mercury, excluding any associated elements, and includes mercury in particulate, vapors, aerosols, and compounds.
2. Emission standard. Emissions from sludge incineration plants, sludge plants, or combinations of these that process wastewater treatment plant sludges shall not exceed 7.05 pounds of mercury per 24-hour period.

C. Beryllium

1. Federal Standard.

   Affected facilities. Extraction plants, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

   Emission Standard. Emissions from stationary sources subject to this provision shall not exceed 10 grams of beryllium over a 24-hour period.

2. Texas Concentration Standard

   0.01 ug/m^3, 24 hr avg. (To be measured by the difference between upwind and downwind concentration levels for the source premises, or by stack sampling, calculated to a downwind concentration (details in appendices of Texas Air Regulations.)

D. Hazardous Pollutants - General

1. The utmost consideration shall be given to the potential harmful effects of and effective control methods for discharages to the open atmosphere of hazardous matters including, but not limited to, antimony, arsenic, asbestos, beryllium, bismuth, lead, mercury, silica, tin and compounds of such materials. Evaluation of these sources and the control methods designed and proposed will be made on a case-by-case basis by the Department. (Kentucky)

E. Two of the selected states, Virginia and Colorado, have chosen to incorporate into their hazardous contaminants category extensive lists of elements and compounds from sources outside the EPA which are aimed primarily at protecting humans from excessive exposure levels of these contaminants. Virginia has incorporated the OSHA air contaminants list in 29CFR 1910.1000 while Colorado has incorporated the ACGIH's published list of "threshold Limit Values" (TLV's) as adopted at the ACGIH 35th Annual Meeting in May 1973. The method each of these states utilizes to determine standards and to enforce such levels for these substances is described in their respective synopses, which also include copies of the complete lists. No attempt has been made to identify relevant compounds on these lists for this project as this falls in line with other work projected for the future work.

XIII. Other Non-Federal Contaminant Regulations Unique to One or Only a Few States

- A. Ice Fog (Alaska)
  - 1. Any person proposing to build or operate an industrial process, fuel burning equipment, or an incinerator in an area of potential ice fog may be required to reduce water emissions and to obtain an operating permit.
- B. General Gaseous Emission Standards
  - 1. Non-process (Tennessee)
    - a) Definitions. "Air contaminant source" for subsection B.1. means any and all sources of emission of air contaminants, whether privately or publicly owned. Without limiting the generality of the foregoing, this term includes all types of business, commercial and industrial plants, works, shops, and stores, and heating and power plants and stations, buildings and other structures of all types,

incinerators of all types (indoor and outdoor), refuse dumps and piles, and all stack and other chimney outlets from any of the foregoing.

b) Standard. Air contaminant sources shall install and utilize the best currently available equipment and control technology.

2. Process (Tennessee)
   Gaseous air contaminant sources shall utilize equipment and technolcgy deemed reasonable and proper by the Board for control of emissions of such contaminants.

C. Mineral Acids - Nitric Acid Mist or Vapor, Hydrochloric Acid Mist or Vapor
   1. Allowable stack gas concentration from any stationary sources.
      Nitric Acid Mist and/or Vapor: 70 mg/DSCM (West Virginia)
      Hydrochloric Acid Mist and/or Vapor: 210 mg/DSCM (West Virginia)

D. Fluorides
   1. Inorganic fluoride compounds
      6 ppb (vol., 3 hr avg., expressed as HF), (Texas)
   2. Fluorine, fluorides (Idaho)
      It is prohibited to discharge such quantities (in combination with all other sources of fluorine and fluorides, both natural and man-made) that the total fluoride content in vegetation for feed or forage resulting from contact with the ambient air exceeds:
      a) 400 ppm (dry) - annual arithematic mean

   b) 60 ppm (dry) - monthly conc. for 2 consecutive months
   c) 80 ppm (dry) - monthly conc. never to be exceeded

3. Phosphate, phosphorite, or phosphorous processing equipment and other fluoride processing or treating equipment. (Montana)
   a) Any phosphate rock or phosphorite or phosphoric acid processing equipment, or equipment processing fluorides enriched wastewater or fluorides in gaseous or particulate form or combinations.
      0.3 lb/T of P_2O_5 introduced (fluoride releasing processes)
   b) Pond emissions. Any fluoride emissions from storage ponds, settling basins, ditches, liquid holding or conveying tank or device associated with facilities in 3.a) above.
      108 ug/cm^2/28 days (calcium formate method)

XIV. Stationary Gas Turbines (Federal - Standards of Performance for Stationary Sources)
   A. Affected facilities: This subpart shall be applicable to all stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour, based on the lower heating value of the fuel fired.
   B. Definitions
      1. "Stationary gas turbine" means any simple cycle gas turbine, regenerative cycle gas turbine or any gas turbine portion of a combined cycle steam/electric generating system that is not self-propelled. It may, however, be mounted on a vehicle for portability.

2. "Simple cycle gas turbine" means any stationary gas turbine which does not recover heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine, or which does not recover heat from the gas turbine exhaust gases to heat water or generate steam.
3. "Regenerative cycle gas turbine" means any stationary gas turbine which recovers heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine.
4. "Combined cycle gas turbine" means any stationary gas turbine which recovers heat from the gas turbine exhaust gases to heat water or generate steam.

C. Emission Standards for Nitrogen Oxides (NO_x)

1. Gas turbines with heat rate at peak load $\geq$ 14.4 kilojoules per watt hr (lower heating value of fuel).

   NO_x emissions, E, in exit gases not to exceed:

   $$E = 0.0075 + F$$

   where:

   E = maximum NO_x emissions in % by volume (at 15% O_2 and on dry basis)

   F = NO_x emission allowance for fuel bound nitrogen as defined in subpart C.3. below.

2. Gas turbines with heat rate at peak load < 14.4 kilojoules per watt hr (lower heating value of fuel).

   NO_x emissions, E, in exit gases not to exceed:

   $$E = 0.0075 \frac{14.4}{Y} + F$$

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

where:

E = maximum NO_x emissions in % by volume (at 15% O_2 and on dry basis)

Y = manufacturer's rated heat duty at peak load in kilojoules per watt hour.

F = NO_x emission allowance for fuel bound nitrogen as defined in C.3. below.

3. The term F shall be defined according to the nitrogen content of the fuel as follows:

Fuel Bound N* (% by Wt)	F (NO_x % by vol.)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04 (N)
$0.1 < N \leq 0.25$	0.004 + 0.0067 (N-0i1)
$N < 0.25$	0.005

*N = Weight % nitrogen in the fuel

4. Exemptions from NO_x Emission Standards
   a) Stationary gas turbines with a heat input at peak load of 107.2 gigajoules per hour (100 MM Btu/hr) or less (lower heating value of fuel) - exempt for not more than 5 years from proposal date of these rules.
   b) Stationary gas turbines using water or steam injection for control of NO_x emissions - exempt when ice fog is deemed a traffic hazard by turbine owner or operator.
   c) Emergency standby gas turbines, military gas turbines other than at garrison facilities, and fire-fighting gas turbines.

MOST STRINGENT AIR QUALITY STANDARDS (CONT)

D. Emission Standards for Sulfur Dioxide (SO_2)
   1. Maximum Emission Rate in Exit Gases
      0.015% SO_2 (by vol., at 15% O_2 and on dry basis)
   2. Use of fuel sulfur content in determination of compliance with subpart D.1. This method may be utilized in the alternative with a maximum sulfur content of 0.8% by weight in any fuel burned by a gas turbine under such circumstances.

IX. ENVIRONMENTAL PROTECTION AGENCY - EFFLUENT GUIDELINES AND STANDARDS

The Environmental Protection Agency (EPA), under the authority of the Water Pollution Control Act Amendments of 1972, has promulgated effluent limitation guidelines and standards which have direct applicability to approximately forty specific categories (e.g. petroleum refineries, fertilizer manufacturing, plastics and synthetics, chemical manufacturing and coal mining).

Even though there is no specific category directly applicable to coal conversion facilities (i.e. gasification or liquefaction), the coal mining category establishes criteria for the coal preparation plants and associated areas subcategory which pertains to the preparation and storage of coal.

Listed below are various effluent limitations as related to various point source categories to illustrate the types and characteristics of effluent limitations which should be considered within the design of a coal conversion facility.

I. Coal Mining Point Source Category, Coal Preparation Plants and Associated Areas (40 CFR 434.2 Subpart B, 42 FR 21380, April 25, 1977)

The provisions of this subpart are applicable to discharges from coal preparation plants and associated areas related to the cleaning or beneficiation of coal of any rank, and the following limitations establish the concentrations of pollutants which may be discharged after application of the best practicable control technology currently available.

A. Where discharges are normally acidic prior to treatment:

Effluent Characteristics	Effluent Limitations	
	Maximum for Any 1 Day	Average of Daily Values for 30 Consecutive Days
Iron (total)	7.0 mg/l	3.5 mg/l
Manganese (total)	4.0 mg/l	2.0 mg/l
TSS	70 mg/l	35 mg/l
pH	Within the range 6.0 to 9.0	

B. Where discharges are normally alkaline prior to treatment:

Effluent Characteristics	Effluent Limitations	
	Maximum for Any 1 Day	Average of Daily Values for 30 Consecutive Days
Iron (total)	7.0 mg/l	3.5 mg/l
TSS	70 mg/l	35 mg/l
pH	Within the range 6.0 to 9.0	

There is, however, an exception to the above listed discharge limitations and that is the provision that any untreated overflow, increase in volume of a point source discharge, or discharge from a by-pass system from facilities designed and maintained to contain or treat the discharges from facilities and areas which would result from a 10-year 24-hour precipitation event (i.e. the maximum 24-hour precipitation event with a probable re-occurence interval of once in 10 years as defined by the National Weather Service and Technical Paper No. 40) shall not be subject to the limitations as set forth above.

C. Definitions.

1. The term "Coal preparation plant", as defined by EPA regulations, means a facility where coal is crushed, screened, sized, cleaned, dried, or otherwise prepared and loaded for transit to a consuming facility.

2. "Coal preparation plant associated areas" means the coal preparation plant yards, immediate access roads, slurry ponds, drainage ponds, coal refuse piles and coal storage piles and facilities.

I. A. Coal Mining Source Category, Coal Preparation Plants and Associated Areas, PROPOSED RULES (40 CFR 434.25 Subpart B, 42 FR 46932, September 19, 1977)

The following limitations establish the concentrations of pollutants which may be discharged by a point source subject to the provisions of this subpart after application of the best available demonstrated control technology.

EPA - EFFLUENT GUIDELINES AND STANDARDS

A. Discharge of process wastewater pollutants from facilities which recycle wastewater for use in processing shall not exceed the following limitation:

1. If the discharges from that point source normally are acidic prior to treatment:

Effluent Characteristics	Effluent Limitations	
	Maximum For Any One Day	Average of Daily Values For 30 Consecutive Days
TSS	70.0 mg/l	35.0 mg/l
Iron (Total)	3.5 mg/l	3.0 mg/l
Manganese (Total)	4.0 mg/l	2.0 mg/l
pH	within the range 6.0 to 9.0	

2. If the discharges from that point source normally are alkaline prior to treament:

Effluent Characteristics	Effluent Limitations	
	Maximum For Any One Day	Average of Daily Values for 30 Consecutive Days
TSS	70.0 mg/l	35.0 mg/l
Iron (Total)	3.5 mg/l	3.0 mg/l
pH	within the range 6.0 to 9.0	

B. Facilities which do not recycle wastewater for use in processing shall not discharge process wastewater pollutants into navigable waters.

C. Exception

Any excess water resulting from rainfall or snow melt, discharged from facilities designed, constructed, and maintained to contain or treat the volume of water which would result from a 10-year 24-hour precipitation event, shall not be subject to the limitations set forth above.

EPA - EFFLUENT GUIDELINES AND STANDARDS

II. Petroleum Refining Point Source Category (40 CFR 419 Subpart B - Cracking Subcategory)

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum by the use of topping and cracking, whether or not the facility includes any process in addition to topping and cracking.

A. The following are standards of performance for new sources.

Effluent Characteristic	Effluent Limitations (Pounds/1000 bbl Feed Stock) Maximum for Any 1 Day	 Average of Daily Values for 30 Consecutive Days
BOD_5	5.8	3.1
TSS	4.0	2.5
COD	41.5	21.0
Oil and Grease	1.7	0.93
Phenolic Compounds	0.042	0.020
Ammonia as N	6.6	3.0
Sulfide	0.037	0.017
Total Chromium	0.084	0.049
Hexavalent Chromium	0.0072	0.0032
pH	Within the range 6.0 to 9.0	

III. Secondary Treatment Information (40 CFR 133, 42 FR 54664, October 7, 1977

The following describes the minimum level of effluent quality attainable by secondary treatment, and is applicable to publicly owned treatment works.

Condition or Substance	
BOD_5	30 mg/l (arithmetic mean of samples collected for 30 consecutive days 45 mg/l (arithmetic mean of samples collected for seven consecutive days
Suspended Solids	The Regional Administration (or state) is authorized to adjust the minimum levels of effluent quality to conform to the suspended solids

Suspended Solids (contd.)	concentrations achievable with best waste stabilization pond technology, provided that 1) wastes stabilization ponds are the sole process used for secondary treatment; 2) the maximum facility design capacity is two million gallons per day or less; and 3) the requirements set forth in 40 CFR 133.101 (b)(1); (b)(2) and (b)(3) cannot be achieved. (42 FR 54664, October 7, 1977).

IV. Safe Drinking Water Act (December 17, 1974) and Related Regulations

The National Interim Primary Drinking Water Regulations establish requirements and related regulations applicable to public water systems. (40 CFR 141) (42 FR 3574, July 11, 1977) (See Part VIII of this section of the report for a complete synopsis of these regulations.)

A. The applicability of these regulations is to each public water system unless the public water system meets one of the following conditions:

1. Consists only of distribution and storage facilities (and does not have any collection or treatment facilities);
2. Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;
3. Does not sell water to any person; and
4. Is not a carrier which conveys passengers in interstate commerce.

B. PROPOSED REGULATIONS under the Safe Drinking Water Act (42 FR 51621, September 19, 1977)

The proposed regulations under this part would establish procedures for designation of areas where an aquifer is the sole or principal source of drinking water. Therefore there are no design criteria proposed under these regulations.

Suspended Solids (contd.)	concentrations achievable with best waste stabilization pond technology, provided that 1) wastes stabilization ponds are the sole process used for secondary treatment; 2) the maximum facility design capacity is two million gallons per day or less; and 3) the requirements set forth in 40 CFR 133.101 (b)(1); (b)(2) and (b)(3) cannot be achieved. (42 FR 54664, October 7, 1977).

IV. Safe Drinking Water Act (December 17, 1974) and Related Regulations

The National Interim Primary Drinking Water Regulations establish requirements and related regulations applicable to public water systems. (40 CFR 141) (42 FR 3574, July 11, 1977) (See Part X. herein for a complete synopsis of these regulations.)

A. The applicability of these regulations is to each public water system unless the public water system meets one of the following conditions:

1. Consists only of distribution and storage facilities (and does not have any collection or treatment facilities);
2. Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;
3. Does not sell water to any person; and
4. Is not a carrier which conveys passengers in interstate commerce.

B. PROPOSED REGULATIONS under the Safe Drinking Water Act (42 FR 51621, September 19, 1977)

The proposed regulations under this part would establish procedures for designation of areas where an aquifer is the sole or principal source of drinking water. Therefore there are no design criteria proposed under these regulations.

V. Environmental Protection Agency (EPA) Pre-treatment Standards (40 CFR 128) (Treatment of Wastewaters from Sources Prior to Introduction into Joint Treatment Works)

These standards would be applicable should an industry choose to use a publicly served treatment works for its waste water treatment and if it were considered as a major contributing industry.

A. Prohibited Wastes

The following wastes shall not be introduced into the publicly owned treatment works:

1. Wastes which would create a fire or explosion hazard.
2. Wastes which would cause corrosive structural damage, but in no case wastes with a pH lower than 5.0 unless the treatment works is designed to accommodate such wastes.
3. Solid or viscous wastes in amounts to interfere with the proper operation of the treatment works.
4. Wastes at a flow rate and/or pollutant discharge rate over short periods of time which would create treatment process upsets.

B. Pretreatment for Incompatible Pollutants.

In addition to the prohibited wastes, the pretreatment standards for incompatible pollutants introduced into a publicly owned treatment works shall be the effluent limitations guidelines defining best practicable control technology currently available: Provided that if the treatment works is committed, in its NPDES permit, to removing a specified percentage of any incompatible pollutant, the pretreatment standard shall be correspondingly reduced for that pollutant, and when effluent guidelines for each industry category are promulgated, a provision concerning the application of such guidelines to pretreatment will be proposed.

VI. NPDES PERMIT

The EPA has a further mechanism by which the discharge of pollutants from a facility is controlled and that is by the use of the National Pollutant Discharge Elimination Systems

(NPDES) Permit. Any person who intends to make any discharge to "navigable waters" (under the definitions almost any water is considered navigable water) must apply for and receive a NPDES permit which will set forth the parameters and conditions of discharges.

These NPDES permits are issued by EPA, except where a state has received authority from the EPA to administer their own NPDES permit system. Before a NPDES permit will be issued the state in which the discharge originates must certify to the EPA that all discharges will comply with the applicable effluent limitations.

VII. Proposed EPA Regulations on Hazardous Substances

(Proposed December 30, 1975 - No Final Regulations as of April 15, 1978.)

The Federal Water Pollution Control Act of 1972 prohibits the unauthorized discharge of oil or hazardous substances in harmful quantities. On December 30, 1975, the Environmental Protection Agency (EPA) published proposed regulations pertaining to the categorization of some 300 substances, including ammonia, benzine, cyanides and phenol, as hazardous and would establish the "harmful quantity" of each listed substance. The proposed list of hazardous substances and the category of each is available upon request from the writers.

The applicability of these regulations would be to the unauthorized discharge of harmful quantities of hazardous substances. EPA has proposed that several hundred substances be designated as hazardous and has established the harmful quantity of a hazardous substance on the basis of the EPA designated toxicity category for the particular substance. Four toxicity categories and the harmful quantities would be designated. These proposed categories and quantity designations are as follows:

Category	Respective Range	Harmful Quantity (lbs)
A	LC50* 1ppm	1.0
B	1ppm LC50 10ppm	10
C	10ppm LC50 100ppm	100
D	100ppm LC50 500ppm	500

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*LC50 means that concentration of material which is lethal to one-half of the test population of aquatic animals upon continuous exposure for 96 hours or less.

EPA - EFFLUENT GUIDELINES AND STANDARDS

VIII. Guidelines for the Land Disposal of Solid Wastes (40 CFR 241)

These guidelines contain recommendations and requirements which are applicable to land disposal of all solid material except for hazardous, agricultural and mining wastes. The requirement sections set forth minimum levels of performance required of any solid waste land disposal site. The recommended procedures suggest preferred methods to realize the objectives of the requirements.

Only those recommended and required provisions applicable to Air and Water Quality are set forth below.

A. Water Quality.

1. Requirement.

The location, design, construction and operation of the land disposal site shall conform to the most stringent of applicable water quality standards established. In the absence of such standards the land disposal site shall provide adequate protection to ground and surface waters used as drinking water supplies.

2. Recommended.

Any disposal plans should include:

a. Current and projected use of water resources.

b. Ground water elevation and movement.

c. Background and initial quality of water resource in the potential zone of influence of the land disposal site.

d. Description of soil and other geologic materials to a depth adequate to allow evaluation of the quality or protection provided by the soil and other geologic material.

e. Provision for surface water runoff control.

f. Potential of leachate generation and proposed control systems for ground and surface water resources.

g. If a land disposal site is located in a flood plain, it should be protected against at least the 50-year design flood by impervious dikes and other appropriate means so as to prevent the floodwaters from contacting the solid waste.

h. Surface water courses and runoff should be diverted by means such as trenches, conduits and proper grading.

i. Retention basins or other approved methods of retarding runoff should be used where necessary.

j. Leachate collection and treatment should be used where necessary.

B. Air Quality

1. Requirement.

a. The design, construction and operation of the land disposal site shall conform to the applicable ambient air quality standards and source control regulations or state or local standards if the latter are more stringent.

b. Decomposition gases generated within the land disposal site shall be controlled on site as necessary.

2. Recommended.

a. Dust control measures should be initiated as necessary.

b. Decomposition gases should not be allowed to migrate laterally from the land disposal site.

c. Decomposition gases should not be allowed to concentrtate in a manner that will pose an explosion or toxicity hazard.

C. Solid Waste Planning and Disposal (Proposed Rules) (42 FR 34446, July 5, 1977)

These proposed rules solicit comments, prior to publication of specific proposals for further comments, for:

EPA - EFFLUENT GUIDELINES AND STANDARDS

1. Guidelines for Land Disposal of Solid Waste;
2. Criteria for Classification of Solid Waste Disposal Facilities;
3. Guidelines for Land Disposal of Municipal Wastewater Treatment Sludge; and
4. State Planning Guidelines.

These provide no proposed design criteria.

IX. Solid Waste Disposal Act As Amended by the Resource Conservation and Recovery Act of 1976

A. Interim guidelines were published by the Environmental Protection Agency on May 16, 1977 (42 FR 24926). These guidelines are to assist state and local governments in the identification of areas with common waste management problems (40 CFR 255).

B. These guidelines, which take effect June 15, are for the purpose of encouraging and facilitating the development of regional planning for solid waste management, the identification of solid waste management regions, and of state and local agencies' responsibilities for putting together a state solid waste management plan, which is required for federal assistance under the Solid Waste Disposal Act. Therefore, the present guidelines as of October 31, 1977) provide no design criteria.

C. Proposed Rules - Development of Regulations for The Transportation of Hazardous Waste. (40 CRF 250, 42 FR 51625, September 29, 1977).

  1. These proposed rules request certain information to be supplied and propose no design criteria.

X. NATIONAL INTERIM PRIMARY DRINKING WATER REGULATIONS

Basis: Code of Federal Regulations, Title 40, Part 141

Agency: Environmental Protection Agency

Note:
1. These National Interim Primary Drinking Water Regulations are incorporated into some of the individual state's water quality standards, especially subpart B - Maximum Contaminant Levels.
2. This synopsis does not include the monitoring and analytical requirements nor the reporting and record-keeping provisions of the regulations.

I. APPLICABILITY

A. These regulations apply to each public water system unless the public water system meets all of the following conditions:

1. Consists only of distribution and storage facilities (and does not have any collection and treatment facilities);
2. Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;
3. Does not sell water to any person; and
4. Is not a carrier which conveys passengers in interstate commerce.

II. MAXIMUM CONTAMINANT LEVELS

A. Maximum Contaminant Levels for Inorganic Chemicals

1.

Contaminant	Maximum Level mg/l
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Lead	0.05
Mercury	0.002
Nitrate (as N)	10.0
Selenium	0.01
Silver	0.05

NATIONAL INTERIM PRIMARY DRINKING WATER REGULATIONS

II. MAXIMUM CONTAMINANT LEVELS (CONTD.)

2. Fluoride

Temperature, °F	Maximum Level mg/l
53.7 and below	2.4
53.8 to 58.3	2.2
58.4 to 63.8	2.0
63.9 to 70.6	1.8
70.7 to 79.2	1.6
79.3 to 90.5	1.4

III. MAXIMUM CONTAMINANT LEVELS FOR ORGANIC CHEMICALS

The levels for organic chemicals are very specific and the detailed regulations should be consulted where appropriate to determine applicability.

IV. MAXIMUM CONTAMINANT LEVELS FOR TURBIDITY

A. One Turbidity Unit (TU), as determined by a monthly average, except that five or fewer turbidity units may be allowed if it can be demonstrated that the higher turbidity does not do any of the following:

1. Interfere with disinfection;

2. Prevent maintenance of an effective disinfecant agent throughout the distribution systems; or

3. Interfere with microbiological determinations .

B. Five turbidity units based on an average for two consecutive days.

V. MAXIMUM MICROBIOLOGICAL CONTAMINANT LEVELS

A. Coliform Bacteria

1. When the membrane filter technique is used the number of coliform bacteria shall not exceed the following:

a. 1/100 ml as the arithmetic mean of all samples examined per month.

b. 4/100 ml in more than one sample when less than 20 are examined per month; or

V. MAXIMUM MICROBIOLOGICAL CONTAMINANT LEVELS (CONTD.)

c. 4/100 ml in more than five percent of the samples when 20 or more are examined per month.

2. When the fermentation tube method and 10 milliliter standard portions are used, coliform bacteria shall not be present in any of the following:

   a. More than 10 percent of the portions in any month;

   b. Three or more portions in more than one sample when less than 20 samples are examined per month; or

   c. Three or more portions in more than five percent of the samples when 20 or more samples are examined per month.

3. When the fermentation tube method and 100 milliliter standard portions are used, coliform bacteria shall not be present in any of the following:

   a. More than 60 percent of the portions in any month;

   b. Five portions in more than one sample when less than five samples are examined per month; or

   c. Five portions in more than 20 percent of the samples when five or more samples are examined per month.

XI. U.S. PUBLIC HEALTH SERVICE DRINKING WATER STANDARDS. 1962

Agency: U.S. Department of Health, Education and Welfare,
Public Health Service

Note: Only a brief synopsis of the standards of general applicability are presented herein. Where specific criteria pertaining to areas such as bacteriological quality and radioactivity limitations are necessary the complete standards should be consulted.

I. CHEMICAL CHARACTERISTICS

A. The following chemical substances should not be present in a water supply in excess of the listed concentrations:

Substance	Concentration In Mg/l
Alkyl Benzene Sulfonate (ABS)	0.5
Arsenic (As)	0.01
Chloride (Cl)	250
Copper (Cu)	1.0
Carbon Chloroform Extract (CCE)	0.2
Cyanide (CN)	0.01
Fluoride	(see B below)
Iron (Fe)	0.3
Manganese (Mn)	0.05
Nitrate (NO_3)	250
Phenols	0.001
Sulfate (SO_4)	250
Total Dissolved Solids	500
Zinc (Zn)	.5

B. Fluoride

When fluoride is naturally present in drinking water the concentration should not average more than the appropriate upper limit in the following table. Presence of fluoride in average concentrations greater than two times the optimum values in the following table shall constitute grounds for rejection of the supply.

Where fluoridation (supplementation of fluoride in drinking water) is practiced, the average fluoride concentration shall be kept within the upper and lower control limits as shown from the table on the following page:

U.S. PUBLIC HEALTH SERVICE DRINKING WATER STANDARDS, 1962

Annual Average of Maximum Daily Air Temperatures[1]	Recommended Control Limits Fluoride Concentration in mg/l		
	Lower	Optimum	Upper
50.0 - 53.7	0.9	1.2	1.7
53.8 - 58.3	0.8	1.1	1.5
58.4 - 63.8	0.8	1.0	1.3
63.9 - 70.6	0.7	0.9	1.2
70.7 - 79.2	0.7	0.8	1.0
79.3 - 90.5	0.6	0.7	0.8

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[1] Based on temperature data obtained for a minimum of five years.

Fluoridation and defluoridation supplies shall be sampled with sufficient frequency to determine that the desired fluoride concentration is maintained.

C. The presence of the following substances in excess of the concentrations listed shall constitute grounds for rejection of the water supply:

Substance	Concentration in mg/l
Arsenic (As)	0.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Chromium (Hexavalent) (Cr^{+6})	0.05
Cyanide (CN)	0.2
Fluoride	(See B above)
Lead (Pb)	0.05
Selenium (Se)	0.01
Silver (Ag)	0.05

II. PHYSICAL CHARACTERISTICS

A. Limits

Drinking water should contain no impurity which would cause offense to the sense of sight, taste or smell. Under general use, the following limits should not be exceeded.

Turbidity	5 Units
Color	15 Units
Threshold Odor Number	3

XII. FEDERAL EMISSION STANDARDS - STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

I. Standards of Performance for Coal Preparation Plants (40 CFR, Part 60.250)

A. Particulate Matter

1. Maximum Concentration from any Thermal Dryer

0.031 gr/DSCF effluent gas

2. Maximum Concentration from any Pneumatic Coal Cleaning Equipment

0.018 gr/DSCF effluent gas

B. Visible Emissions (Opacity)

1. Maximum Visible Emissions from any Thermal Dryer

20% Opacity

2. Maximum Visible Emissions from any Pneumatic Coal Cleaning Equipment

10% Opacity

II. Standards of Performance for Fossil-Fuel Fired Steam Generators (40 CFR, Part 60.40)

A. Affected Facilities: Fossil-fuel fired stream generating units of more than 250 MM Btu/hr heat input.

B. Definitions

1. "Fossil fuel": means natural gas, petroleum, coal, and any form of solid, liquid, or gaseous fuel derived from such materials to create useful heat.

2. "Fossil-fuel fired steam generator" means a furnace or boiler used in the process of burning fossil fuel to produce steam by heat transfer.

3. "Coal" means all solid fuels classified as anthracite, bituminous, subbituminous or lignite by the American Society for Testing Material. Designation D388-66.

C. Particulate Matter

1. Maximum Emission Rate

0.10 lb/MM Btu heat input derived from the fossil fuel.

FEDERAL EMISSION STANDARDS - STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

II. Standards of Performance for Fossil-Fuel Fired Steam Generators (Contd.)

D. Visible Emissions

1. Maximum Emission Standard

20% opacity; however, an opacity of 27% is permissible for not more than 6 minutes in any hour.

E. Sulfur Dioxide (SO_2)

1. Maximum SO_2 Emission Rate

a) Liquid fossil fuel fired: 0.80 lb/MM Btu heat input
b) Solid fossil fuel fired: 1.2 lb/MM Btu heat input
c) For any combination of liquid and solid fossil fuels burned simultaneously use:

$$E = (0.8Y+1.2Z)/(Y+Z)$$

where: E is the maximum allowable SO_2 rate in lb/MM Btu total heat input; and Y is the % of the total heat input derived from liquid fossil fuel; and Z is the % of total heat input derived from solid fossil fuel.

Compliance shall be determined by use of the total heat input from all fossil fuels burned, including gaseous fuels.

F. Nitrogen Oxides (NO_x)

1. Maximum NO_x Emission Rate (expressed as NO_2)

a) Gaseous fossil fuel fired: 0.20 lb/MM Btu heat input
b) Liquid fossil fuel fired: 0.30 lb/MM Btu heat input
c) Solid fossil fuel fired: 0.70 lb/MM Btu heat input (except lignite or a solid fossil fuel containing 25%, by weight, or more of coal refuse*)
d) Lignite fired: 0.60 lb/MM Btu heat input
e) Lignite fired (where lignite is mined in N. Dakota, S. Dakota or Montana and burned in a cyclone-fired unit): 0.80 lb/MM Btu heat input
f) For any combination of gaseous, liquid, and solid fossil fuels burned simultaneously use**:

$$E = (0.2X+0.3Y+0.72+0.6W)/(X+Y+Z+W)$$

FEDERAL EMISSION STANDARDS - STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

II. Standards of Performance for Fossil-Fuel Fired Steam Generators (Contd.)

where: E is the maximum allowable NO_x rate in lb(expressed as NO_2)/MM Btu total heat input; and X is the % of the total heat input derived from gaseous fossil fuel; Y is the % of total heat input derived from liquid fossil fuel; Z is the % of total heat input derived from solid fossil fuel (except lignite or a solid fossil fuel containing 25%, by weight, or more of coal refuse*); and W is the % of total heat input derived from lignite.

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* When a solid fossil fuel containing 25% by weight, or more, of coal refuse is burned in combination with gaseous, liquid, or other solid fossil fuel, the standard for nitrogen oxides does not apply.

**Cyclone-fired units which burn fuels containing at least 25 percent of lignite that is mined in N. Dakota, S. Dakota, or Montana remain subject to 1.e) regardless of the types of fuel combusted in combination with that lignite.

III. Standards of Performance for Incinerators (40 CFR, Part 60.50)

A. Affected facilities: Incinerators of more than 50 T/D (24 hours) charging rate.

B. Definitions

1. "Incinerator" means any furnace used for burning solid waste for the purpose of reducing the waste volume by removing combustible matter.

2. "Solid Waste" means refuse, more than 50 percent of which consists of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustibles, and noncombustibles such as glass and rock.

C. Maximum Particulate Matter Emission Rate

0.08 gr/DSCF, corrected to 12% CO_2

FEDERAL EMISSION STANDARDS - STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

IV. Standards of Performance for Storage Vessels for Petroleum Liquids (40 CFR, Part 60.110)

A. Affected facilities: This subpart shall be applicable to each storage vessel for petroleum liquids which has a storage capacity greater than 40,000 gallons. This subpart shall not be applicable to such storage vessels utilized for storage, processing, and/or treating at a production facility prior to custody transfer.

B. Definitions

1. "Storage Vessel" means any tank, reservoir, or container used for storage of petroleum liquids, but does not include:
   a) Pressure vessels designed to operate in excess of 15 pounds per square inch gauge without emissions to the atmosphere except under emergency conditions,
   b) Subsurface caverns or porous rock reservoirs, or
   c) Underground tanks if the total volume of petroleum liquids added to and taken from a tank annually does not exceed twice the volume of the tank.

2. "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

3. "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Number 2 through Number 6 fuel oils as specified in A.S.T.M. D 396-69, gas turbine fuel oils Numbers 2-GT through 4-GT as specified in A.S.T.M. D 2880-71, or diesel fuel oils Numbers 2-D and 4-D as specified in A.S.T.M. D 965-68.

4. "Petroleum Refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives.

5. "Custody transfer" means the transfer of produced petroleum and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

IV. Standards of Performance for Storage Vessels for Petroleum Liquids (40 CFR, Part 60.110) (Contd.)

C. Hydrocarbons. Petroleum liquids shall be stored in affected storage vessels or facilities as follows:

1. If the true vapor pressure of the petroleum liquid, as stored, is equal to or greater than 1.5 psia but not greater than 11.1 psia, the storage vessel shall be equipped with a floating roof, a vapor recovery system, or the equivalent thereof.

2. If the true vapor pressure of the petroleum liquid is greater than 11.1 psia, the storage vessel shall be equipped with a vapor recovery system or its equivalent.

V. Standards of Performance for Petroleum Refineries (40 CFR, Part 60.100)

A. Affected facilities: The provisions of this subpart are applicable to fluid catalytic cracking unit catalyst regenerators, fuel gas combustion devices, and all Claus sulfur recovery plants except Claus plants of 20 long tons per day (LTD) or less associated with a small petroleum refinery. The Claus sulfur recovery plant need not be physically located within the boundaries of a petroleum refinery to be an affected facility, provided it processes gases produced within a petroleum refinery.

B. Definitions

1. "Petroleum" means crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

2. "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives.

3. "Fuel gas combustion device" means any equipment, such as process heaters, boilers, and flares used to combust fuel gas but does not include fluid coking unit and fluid catalytic cracking unit incinerator-waste heat boilers or facilities in which gases are combusted to produce sulfur or sulfuric acid.

4. "Process upset gas" means any gas generated by a petroleum refinery process unit as a result of startup, shut-down, upset or malfunction.

V. Standards of Performance for Petroleum Refineries (40 CFR, Part 60.100) (Contd.)

5. "Claus sulfur recovery plant" means a process unit which recovers sulfur from hydrogen sulfide by a vapor-phase catalytic reaction of sulfur dioxide and hydrogen sulfide.

6. "Oxidation control system" means an emission control system which reduces emissions from sulfur recovery plants by converting these emissions to sulfur dioxide.

7. "Reduction control systems" means an emission control system which reduces emissions from sulfur recovery plants by converting these emissions to hydrogen sulfide.

8. "Reduced sulfur compounds" mean hydrogen sulfide (H_2S), carbonyl sulfide (COS) and carbon disulfide (CS_2).

9. "Small petroleum refinery" means a petroleum refinery which has a crude oil processing capacity of 50,000 barrels per stream day or less, and which is owned or controlled by a refinery with a total combined crude oil processing capacity of 137,500 barrels per stream day or less.

C. Emission Standards for Particulate Matter and Visible Emissions

1. The following discharges into the atmosphere from any fluid catalytic cracking unit catalyst regenerator are prohibited:

   a) Particulate Matter

      in excess of 1.0 lb/1000 lb of coke burn-off in catalyst regenerator

   b) Visible Emissions

      30% opacity or greater, except for 6 minutes in any hour

2. Where auxiliary liquid or solid fossil fuels are burned in the fluid catalytic cracking unit incinerator-waste heat boiler, particulate matter in excess of that permitted in subpart B.1.a above may be emitted to the atmosphere, except that the rate shall not exceed 0.10 lb/million Btu of heat input attributable to such liquid or solid fuel.

D. Carbon Monoxide (CO) Standards
The carbon monoxide content of any gases discharged to the atmosphere from the fluid catalytic cracking unit catalyst regenerator shall not be excess of 0.050 percent by volume.

E. Sulfur Dioxide Standards

1. Fuel Gas Combustion Devices

Any fuel gas containing H_2S in excess of 0.10 gr/DSCF shall not be burned in any fuel gas combustion device. However, the exhaust gases from the combustion of fuel gas may be treated in a manner which limits the emission of SO_2 if it is shown to the satisfaction of the Administrator of the Environmental Protection Agency that this prevents SO_2 emissions as effectively as compliance with the above limitation on H_2 concentration in the fuel gas.

2. Exemption for Process Upset Gases

The combustion of process upset gas in a flare, or the combustion of process or fuel gas in a flare as a result of relief valve leakage is exempt from the requirements of subsection E.1. above.

3. Claus Sulfur Recovery Plants

No discharge shall be allowed of any gases to the atmosphere containing in excess of:

a) 0.025% (vol.) of SO_2 at 0.0% O_2, dry basis, where emissions are controlled by an oxidation control system, or a reduction control system followed by incineration, or

b) 0.030% (vol.) of reduced sulfur compounds and 0.001% (vol.) of H_2S calculated as SO_2, at 0.0% O_2, on a dry basis, if emissions are controlled by a reduction control system not followed by incineration.

VI. Standards of Performance for Stationary Gas Turbines*

A. Affected facilities: This subpart shall be applicable to all stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigojoules per hour, based on the lower heating value of the fuel fired.

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*Proposed addition to 40 CFR Part 60; 42 FR 53782, October 3, 1977.

VI. Standards of Performance for Stationary Gas Turbines (Contd.)

B. Definitions

1. "Stationary gas turbine" means any simple cycle gas turbine, regenerative cycle gas turbine or any gas turbine portion of a combined cycle steam/electric generating system that is not self-propelled. It may, however, be mounted on a vehicle for portability.

2. "Simple cycle gas turbine" means any stationary gas turbine which does not recover heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine, or which does not recover heat from the gas turbine exhaust gases to heat water or generate steam.

3. "Regenerative cycle gas turbine" mean any stationary gas turbine which recovers heat from the gas turbine exhaust gases to preheat the inlet combustion air to the gas turbine.

4. "Combined cycle gas turbine" means any stationary gas turbine which recovers heat from the gas turbine exhaust gases to heat water or generate steam.

5. "Emergency gas turbine" means any stationary gas turbine which operates as a mechanical or electrical power source only when the primary power source for a facility has been rendered inoperable by an emergency situation.

6. "Ice fog" means an atmospheric suspension of highly reflective ice crystals.

7. "Peak load" means 100 percent of the nanufacturer's design capacity of the gas turbine.

8. "Base load" means the load level at which a gas turbine is normally operated.

9. "Fire-fighting turbine" means any stationary gas turbine that is used primarily to pump water for extinguishing fires.

VI. Standards of Performance for Stationary Gas Turbines (Contd.)

C. Emission Standards for Nitrogen Oxides (NO_x)

1. Gas turbi [illegible] th heat rate at peak load $\geq$ 14.4 kilojoule [illegible] wa hr (lower heating value of fuel).

   NO_x emission , E, in exit gases not to exceed:

   $$E = 0.0075 + F$$

   where:

   E = maximum NO_x emissions in % by volume (at 15% O_2 and on dry basis)
   F = NO_x emission allowance for fuel bound nitrogen as defined in subpart C.3. below

2. Gas turbines with heat rate at peak load < 14.4 kilojoules per watt hr (lower heating value of fuel.

   NO_x emissions, E, in exit gases not to exceed

   $$E = 0.0075 \frac{14.4}{Y} + F$$

   where:

   E = maximum NO_x emissions in % by volume (at 15% O_2 and on dry basis)
   Y = manufacturer's rated heat duty at peak load in kilojoules per watt hour.
   F = NO_x emission allowance for fuel bound nitrogen as defined in C.3. below.

3. The term F shall be defined according to the nitrogen content of the fuel as follows:

Fuel Bound N* (% by Wt)	F (NO_x % by vol.)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04 (N)
$0.1 < N \leq 0.25$	0.004 + 0.0067 (N-Oil)
$N < 0.25$	0.005

*N = Weight % nitrogen in the fuel

4. Exemptions from NO_x Emission Standards

   a) Stationary gas turbines with a heat input at peak load of 107.2 gigajoules per hour (100 MM Btu/hr) or less (lower heating value of fuel) - exempt for not more than 5 years from proposal date of these rules.

VI. Standards of Performance for Stationary Gas Turbines (Contd.)

b) Stationary gas turbines using water or steam injection for control of NO_x emissions - exempt when ice fog is deemed a traffic hazard by turbine owner or operator.

c) Emergency standby gas turbines, military gas turbines other than at garrison facilities, and fire-fighting gas turbines.

D. Emission Standards for Sulfur Dioxide (SO_2)

1. Maximum Emission Rate in Exit Gases
0.015% SO_2 (by vol., at 15% O_2 and on dry basis)

2. Use of fuel sulfur content as alternative in determination of compliance with subpart D.1. This method may be utilized in the alternative with a maximum sulfur content of 0.8% by weight in any fuel burned by a gas turbine under such circumstances.

XIII. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

I. National Emission Standard for Mercury (40 CFR, Part 61.50)

A. Definitions

1. "Mercury" means the element mercury, excluding any associated elements, and includes mercury in particulate, vapors, aerosols, and compounds.

2. "Sludge" means sludge produced by a treatment plant that processes municipal or industrial waste waters.

B. Emission standard. Emissions to the atmosphere from sludge incineration plants, sludge plants, or combinations of these that process wastewater treatment plant sludges shall not exceed 7.05 pounds of mercury per 24-hour period.

II. National Emission Standard for Beryllium (40 CFR, Part 61.30)

A. Definitions

1. "Beryllium" means the element beryllium. Where weights or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any associated elements.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

II. National Emission Standard for Beryllium (40 CFR, Part 61.30) (Contd.)

B. Affected Facilities

1. Extraction plants, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

C. Standards

1. Emissions to the atmosphere from stationary sources subject to this provision shall not exceed 10 grams of beryllium over a 24-hour period.

XIV. NATIONAL AMBIENT AIR QUALITY STANDARDS
(40 CFR Part 50)

Pollutant	Primary Standards	Secondary Standards
Sulfur Oxides (measured as sulfur dioxide)	80 ugm/m^3 (aam)* 0.03 ppm ----------------- 365 ugm/m^3 0.14 ppm (24 hr)^1	1300 ugm/m^3 0.50 ppm (3 hr)^1
Particulate	75 ugm/m^3 (agm)* 260 ugm/m^3 (24 hr)^1	60 ugm/m^3 (agm)* (guide for 24 hr std) 150 ugm/m (24 hr)^1
Carbon Monoxide	10 mgm/m^3 (8 hr)^1 9 ppm ------------------ 40 mgm/m^3 (1 hr)^1 35 ppm	10 mgm/m^3 (8 hr)^1 9 ppm ------------------- 40 mgm/m^3 (1 hr)^1 35 ppm
Photochemical Oxidants	160 ugm/m^3 (1 hr)^1 0.08 ppm	160 ugm/m^3 (1 hr)^1 0.08 ppm
Nonmethane Hydrocarbons (as guide for oxidant stds)	160 gm/m^3 (3 hr)$^{1,\ 2}$ 0.24 ppm	160 gm/m^3 (3 hr)$^{1,\ 2}$ 0.24 ppm
Nitrogen Oxide (measured as nitrogen dioxide)	100 gm/m^3 (aam)* 0.05 ppm	100 gm/m^3 (aam)* 0.05 ppm

1 - concentration not to be exceeded more than once a year.
2 - 6:00 a.m. to 9:00 a.m.
* - aam = annual arithmetic mean; agm = annual geometric mean
40 C.F.R. Part 50

AMBIENT AIR QUALITY STANDARDS - SELECTED STATES

I. STATE AMBIENT AIR STANDARDS CLOSELY PARALLELING NATIONAL STANDARDS

A. Alabama

Adopts current National Standards.

B. Alaska

1. Standards for contaminants covered by National Standards are the same as those standards except for the following changes:

    a) Sulfur Oxides

    The National secondary standard is adopted as one of the sulfur oxide primary standards (1300 ug/m^3, 3 hr average, not to be exceeded more than once per year).

    b) Particulate - Primary Standards

    60 ug/m^3, annual geometric mean;
    150 ug/m^3, 24 hr average, not to be exceeded more than once per year
    (these standards adopted are identical to the National secondary standards)

2. Additional contaminant ambient standards are as follows:

    a) Reduced Sulfur Compounds - Primary Standard

    50 ug/m^3, 30 min. average, not to be exceeded more than once per year.

C. Idaho

Standards for contaminants covered by the National Standards are the same as those standards. Additional contaminant ambient standards are as follows:

1. Settleable Particulates - Primary and Secondary Standards.
   0.8 mg/cm^2/mo, not to be exceeded more than 25% of the time.

2. Beryllium - Primary and Secondary Standards.
   0.01 ug/m^3, max. 24 hr avg., not to be exceeded more than once a year.

I. STATE AMBIENT AIR STANDARDS CLOSELY PARALLELING NATIONAL STANDARDS (CONTD)

C. Idaho (Contd.)

3. Sulfuric acid mist - Primary and Secondary Standards.

a) 12 ug/m^3, max. 24 hr concentration, not to be exceeded more than once per month.

b) 30 ug/m^3, max. 1 hr concentration, not to be exceeded more than twice per week.

4. Fluorides - Primary and Secondary Standards

Standards are those concentrations in the ambient air which will result in a total fluoride content in vegetation used for feed and forage of no more than:

a) 40 ppm, dry basis, annual arith. mean;
b) 60 ppm, dry basis, monthly average concen. for two consecutive months;
c) 80 ppm, dry basis, monthly average concen. never to be exceeded.

D. Illinois

Standards match current National Standards exactly. (Does not designate secondary standards for CO, photochemical oxidants, hydrocarbons, or NO_x; however, there is no difference in the primary and secondary National Standards for these.)

E. Indiana

Standards match National Standards exactly except that no secondary standard yearly average is shown as a guide for the 24 hr secondary standard for particulates.

F. Kansas

Incorporates current National Standards by absence of language designating ambient air standards.

G. Kentucky

Standards match National Standards exactly. Additional contaminant ambient standards are as follows:

1. Settleable particulates (total water solubles and insolubles)
   15 T/mi^2/mo., maximum 3 mo average, not to be exceeded more than once/year.

2. Particulate Matter - Soiling index (LF = linear feet)

   a) Primary standard. 6.0 COH/1000 LF, max. 24 hr avg, not to be exceeded more than once/yr.

   b) Secondary standard

      0.4 COH/1000 LF, annual arithmetic mean;
      0.5 COH/1000 LF, max. 3 mo. avg., not to be exceeded more than once/yr;
      0.3 COH/1000 LF, max. 24 hr. avg., not to be exceeded more than once/year.

H. Missouri

Incorporates current National Standards for outstate area (absence of relevant language has this effect)

I. Pennsylvania

Incorporates current National Standards by reference. Additional contaminant ambient standards are as follows:

Contaminant	Concentration Averaged Over			
	1 Year	30 Days	24 Hours	1 Hour
Settle Particulate (total)	0.8 $mg/cm^2/mo$	1.5 $mg/cm^3/mo$	--	--
Lead	--	1.5 ug/m^3 (three-month average)	--	--
Beryllium	--	0.01 ug/m^3 D	--	--
Sulfates (as H_2SO_4)	--	10 ug/m^3	30 ug/m^3	--
Fluorides (total soluble, as HF)	--	--	5 ug/m^3	--
H_2S	--	--	0.005 ppm	0.1 ppm

I. STATE AMBIENT AIR STANDARDS CLOSELY PARALLELING NATIONAL STANDARDS (CONTD)

J. Texas

Incorporates current National Standards by reference. Additional contaminant ambient standards (primary) are as follows:

1. Beryllium
   0.01 ug/m^3, 24 hr average.

2. Inorganic Fluoride Compounds

   a) Gaseous Inorganic Fluorides (calculated as HF)
      4.5 ppb (vol.), 12 hr. average;
      3.5 ppb (vol.), 24 hr. average;
      2.0 ppb (vol.), 7 day average;
      1.0 ppb (vol.), 30 day average;

   b) Inorganic Fluorides In or On Forage (Type D Land Use Areas only calculated as fluoride ion)
      40 ppm (wt.), 12 mo. average
         (sample taken once/mo.);
      60 ppm (wt.), 3 mo. average
         (sample taken once/mo.);
      80 ppm (wt.), 2 mo. average
         (sample taken once/mo.).

K. Utah.

Incorporates current National Standards.

L. Virginia.

Standards match current National Standards exactly.

M. West Virginia

Standards match current National Standards exactly.

II. STATE AMBIENT STANDARDS DIFFERING FROM NATIONAL STANDARDS IN AT LEAST SOME SIGNIFICANT ASPECTS.

A. Colorado

Changes or additions as to contaminants covered by the National Standards are as follows:

1. Sulfur Dioxide - Primary Standard

   60 ug/m^3 (.021 ppm), annual arith. mean;
   260 ug/m^3 (.091 ppm), 24 hr average, not to be exceeded more than once per yr.;
   1300 ug/m^3 (.455 ppm) 3 hr average, not to be exceeded more than once per year.

2. Particulate -
   45 ug/m^3, annual arith. mean;
   150 ug/m^3, 24 hr average, not to be exceeded more than once per year.

B. Montana

1. National Standards for carbon monoxide, photochemical oxidants, nonmethane hydrocarbons, and nitrogen oxides are in effect (absence of reference to these has this effect).

2. Other state ambient standards for contaminants for which National Standards exist.

   a) Sulfur Dioxide
      0.02 ppm, maximum annual average;
      0.10 ppm, 24 hr average, not to be exceeded for more than 1 hr in any 4 consecutive days;

   b) Suspended Particulates
      75 ug/m^3, annual geometric mean (same as National Standards);
      200 ug/m^3, 24 hr average, not to be exceeded more than 1% of days/yr.

B. Montana (Contd.)

3. Other contaminant ambient standards are as follows:

   a) Lead
      5.0 ug/m^3, 30 day average
   b) Beryllium
      0.01 ug/m^3, 30 day average
   c) Settled Particulates (dustfall)
      residential areas - 15T/mi^2/mo, 3 mo. average;
      heavy industrial areas - 30T/mi^2/mo, 3 mo. average;
   d) Fluorides (Total, as HF)
      1 ppb, 24 hr average
   e) Fluorides (as F)
      in forage for animal consumption - 35 ppm, dry weight basis
   f) Fluorides (gaseous)
      0.3 ug/cm^2/28 days (calcium formate paper measurement technique)
   g) Reactive Sulfur (Sulfation)
      0.25 mg of SO_3/100 cm^2/day, max. annual average;
      0.50 mg of SO_3/100 cm^2/day, max. 1 mo. average
   h) Suspended Sulfate
      4.0 ug/m^3, max. annual average;
      12.0 ug/m^3, not to be exceeded over 1% of the time
   i) Sulfuric Acid Mist
      4.0 ug/m^3, max. annual average;
      12.0 ug/m^3, not to be exceeded over 1% of the time;
      30.0 ug/m^3, hourly average, not to be exceeded over 1% of the time
   j) Hydrogen Sulfide
      0.03 ppm, 1/2 hr average, not to be exceeded more than twice in any 5 consecutive days;
      0.05 ppm, 1/2 hr average, not to be exceeded over twice a year

II. STATE AMBIENT STANDARDS DIFFERING FROM NATIONAL STANDARDS IN AT LEAST SOME SIGNIFICANT ASPECTS (CONTD.)

C. New Mexico

1. Changes or additions as to contaminants covered by the National Standards are as follows (all primary standard as no primary/secondary designation made)

   a) Sulfur Oxides

   0.02 ppm (a.a.m.);
   0.10 ppm, 24 hr average

   b) Particulates

   150 ug/m^3, 24 hr average;
   110 ug/m^3, 7 day average;
   90 ug/m^3, 30 day average;
   60 ug/m^3, annual geometric mean

   c) Carbon Monoxide

   8.7 ppm, 8 hr average;
   13.1 ppm, 1 hr average

   d) Photochemical Oxidants

   0.06 ppm, 1 hr average

   e) Nonmethane Hydrocarbons

   0.19 ppm, 3 hr average

   f) Nitrogen Dioxide

   0.10 ppm, 24 hr average

2. Other contaminant ambient standards are as follows (no separate primary and secondary standards designated)

   a) Hydrogen Sulfide

   0.003 ppm, 1 hr average

   b) Total Reduced Sulfur

   0.003 ppm, 1 hr average, including H_2S

C. New Mexico (Contd.)

c) Maximum allowable concentration of certain elements present in total suspended particulates.

- i) Beryllium - 0.01 ug/m^3, 30 day average
- ii) Asbestos - 0.01 ug/m^3, 30 day average
- iii) heavy metals (total) - 10 ug/m^3, 30 day average

d) Soiling Index
0.4 cobs/1000 linear feet of air, annual average

D. Ohio

Changes or additions as to contaminants covered by the National Standards are as follows:

1. Sulfur Oxides - Primary Standards
60 ug/m^3 (aam; 0.02 ppm, by vol.);
260 ug/m^3 (0.10 ppm, by vol.), not to be exceeded more than one year.

2. Suspended Particulates - Primary Standards
60 ug/m^3 (agm);
150 ug/m^3, 24 hr average, not to be exceeded more than once per yr.

3. Photochemical Oxidants - Primary Standards
119 ug/m^3 (0.06 ppm), 1 hr average;
79 ug/m^3 (0.04 ppm), 4 hr arithmetic mean, not to be exceeded more than once per yr;
40 ug/m^3 (0.02 ppm), 24 hr arithmetic mean, not to be exceeded more than once per yr.

4. Nonmethane Hydrocarbons - Primary Standards
126 ug/m^3 (0.19 ppm), 3 hr arithmetic mean, between the hours of 6:00 A.M. and 9:00 A.M.;
33 ug/m^3 (0.50 ppm), 24 hr arithmetic mean, not to be exceeded more than once per yr.

II. STATE AMBIENT STANDARDS DIFFERING FROM NATIONAL STANDARDS IN AT LEAST SOME SIGNIFICANT ASPECTS (CONTD.)

E. Oklahoma

1. Incorporates National Ambient Air Quality Standards for all of the contaminants covered therein.

2. Non-significant Deterioration Standard (NSD). Additional standards have also been adopted to ensure that new sources will not cause or allow excessive degradation of present air quality. These standards define what is considered excessive degradation and function as tertiary standards for all major new point sources applying for a construction permit and emitting or capable of emitting particulates or sulfur oxides.

    a) The NSD increment standards limitations on increase in concentration over unknown baseline concentrations) established are as follows:

    Sulfur Dioxide - Increment
    650 ug/m^3, 3 hr average;
    130 ug/m^3, 24 hr average;
    30 ug/m^3, annual average

    Particulates - Increment
    55 ug/m^3, 24 hr average;
    15 ug/m^3, annual average

    b) Further, maximum increments shown on permit applications which will trigger Air Council review of the situation are as follows:

    Sulfur Dioxide - Increment
    100 ug/m^3, 24 hr average;
    15 ug/m^3, annual average

    Particulates - Increment
    30 ug/m^3, 24 hr average;
    10 ug/m^3, annual average

    c) An accounting procedure utilizing statistical dispersion modeling to track increases and decreases in the concentration of the relevant contaminants in the ambient air must be implemented in order to enforce increment standards in subsection 2.

II. STATE AMBIENT STANDARDS DIFFERING FROM NATIONAL STANDARDS IN AT LEAST SOME SIGNIFICANT ASPECTS. (CONTD.)

F. Tennessee

Sulfur Dioxide - Secondary Standards

1. Standards match current National Standards exactly except that additional secondary standards for sulfur dioxide are added as follows:

   a) 60 ug/m^3 (0.02 ppm, vol.), maximum annual arithmetic mean
   b) 364 ug/m^3 (0.139 ppm, vol.), maximum 24 hr average

2. Other contaminant ambient standards are as follows:

   a) Gaseous Fluorides (Expressed as HF)
   Primary and secondary standards (not to be exceeded more than once per year):

   1.2 ug/m^3 (1.5 ppb, vol.) max. 30 day average;
   1.6 ug/m^3 (2.0 ppb, vol.) max. 7 day average;
   2.9 ug/m^3 (3.5 ppb, vol.) max. 24 hr average;
   3.7 ug/m^3 (4.5 ppb, vol.) max. 12 hr average

   b) Soiling Index
   Primary Standards:
   1.0 COH's/1000 linear ft of air, max. 24 hr average;
   3.5 COH's/1000 linear ft of air, max. 2 hr average

   Secondary Standards:*
   0.6 COH's/1000 linear ft of air, max. 24 hr average;
   2.0 COH's/1000 linear ft of air, max. 2 hr average;

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*Values not to be exceeded more than once per year.

II. STATE AMBIENT STANDARDS DIFFERING FROM NATIONAL STANDARDS IN AT LEAST SOME SIGNIFICANT ASPECTS. (CONTD.)

G. Washington

1. Standards for carbon monoxide, photochemical oxidants, nonmethane hydrocarbons and nitrogen oxides match current National Ambient Standards exactly except that primary and secondary standards for photochemical oxidants are effective only from 10:00 a.m. to 4:00 p.m., April 1 through Oct. 31 of any year and primary and secondary standards for hydrocarbons are similarly in effect only from 6:00 a.m. to 9:00 a.m., April 1 through Oct. 31 of any year. An air quality objective of 5 ppm (vol), 24 hr average has been adopted for carbon monoxides.

2. Standards for sulfur oxides and particulates are made more stringent than the National Standards as follows:

   a) Sulfur Oxides (expressed as SO_2)
   (deletes an annual arithmetic mean)
   0.10 ppm (vol.), 24 hr average;
   0.40 ppm (vol.), 1 hr average;
   0.25 ppm (vol.), 1 hr average, not to be exceeded more than two times in any consecutive 7 days;
   0.02 ppm (vol.), 1 yr average;
   Air quality objective: 0.3 ppm (vol.), 5 min. average

   b) Particulates (suspended)
   60 ug/m^3, annual geometric mean;
   150 ug/m^3, 24 hr average not to be exceeded more than once per year;
   (has exception provisions for certain areas in recognition of natural background dust loading)
   Air quality objective: 30.0 ug/m^3, not to be exceeded by more than 50% of samples collected in any calendar year

3. Gaseous fluorides (calculated as HF)
   3.7 ug/m^3, 12 hr average;
   2.9 ug/m^3, 24 hr average;
   1.7 ug/m^3, 7 day average;
   0.84 ug/m^3, 30 day average;
   0.50 ug/m^3, average for period of March 1 through Oct. 31 of any year

II. STATE AMBIENT STANDARDS DIFFERING FROM NATIONAL STANDARDS IN AT LEAST SOME SIGNIFICANT ASPECTS. (CONTD.)

H. Wyoming

Standards for carbon monoxide, photochemical oxidants, nonmethane hydrocarbons, and nitrogen oxides match current National Standards exactly. For particulates the more stringent secondary standards are in effect as primary standards (with no new secondary standards designated). The suffer oxide standards adopt the National secondary standard (3 hr averaging period) as a primary standard and lower the two current National primary standards to the following values:

60 ug/m^3 (0.02 ppm), annual arith. mean;
260 ug/m^3 (0.10 ppm), maximum 24 hr average, not to be exceeded more than once a year.

Other contaminant ambient standards are as follows:

a) Soiling Index
0.4 COH units/1000 linear ft, annual geom. mean

b) Fluorides
0.80 ug/m^3 (1 ppb), 24 hr average (measured as HF);
25 ug/g, dry wt. basis, in forage for animal consumption (measured as fluorine);
0.3 ug/cm^2, maximum 30 day average, (gaseous fluorides, measured by sodium formate paper method or equivalent)

c) Hydrogen Sulfide
70 ug/m^3, 1/2 hr average, not to be exceeded over twice per year;
40 ug/m^3, 1/2 hr average, not to be exceeded more than twice in any 5 consecutive days

d) Sulfation (Suspended Sulfate)
0.25 mg SO_3/100 cm^2/day, max. annual average;
0.50 mg SO_3/100 cm^2/day, max. 30 day value

XV. STANDARDS OF SELECTED STATES

ALABAMA WATER QUALITY STANDARDS

Basis: State of Alabama Water Quality Criteria,
As Amended February 1973

Agency: State Water Improvement Commission

I. GENERAL CONDITIONS APPLICABLE TO ALL WATER CRITERIA

A. Tests of analytical procedures to determine compliance, or non-compliance, shall be in accordance with the latest edition of Standard Methods for Examination of Water and Wastewater published by the American Public Health Association, AWWA, and Water Pollution Control Federation.

B. The quality of any waters receiving industrial wastes shall be such as will not cause the best usage to be adversely affected.

C. Samples shall be collected from areas to be representative of the receiving waters after reasonable opportunity for dilution and mixing.

II. MINIMUM CONDITIONS APPLICABLE TO ALL STATE WATERS

A. State waters shall be free from substances attributable to industrial wastes that will settle to form bottom deposits which interfere directly or indirectly with any classified water use.

B. There shall be no floating debris, oil, scum or other floating materials attributal to industrial wastes.

C. There shall be no substances attributal to industrial wastes in combinations which are toxic or harmful to human, animal or aquatic life.

III. WASTE TREATMENT REQUIREMENTS

A. As a minimum, secondary treatment shall be applied to all industrial waste discharge.

"Secondary Treatment" means a facility which at design flow is capable of the following:

1. Removing substantially all floating and settable solids, and

III. WASTE TREATMENT REQUIREMENTS (CONTD.)

2. Achieving a minimum removal of 85% of both the BOD_5 and suspended solids.

A comparable degree of treatment for industrial waste which is not amenable to biological treatment will be provided.

B. In all cases an analysis of water use and flow characteristics for receiving stream shall be made to determine the required degree of treatment.

C. The minimum 7-day low flow that occurs once in 10 years shall be the basis for design criteria.

D. Industrial waste treatment facilities must provide "best practical" waste treatment by 1977 and "best available" treatment by 1983.

IV. SPECIFIC WATER QUALITY CRITERIA (Receiving Water)

Note: The specific water quality criteria is divided into the following water use classifications:

1. Public water supply;
2. Swimming and other whole body water-contact sports;
3. Shell fish harvesting;
4. Fish and wildlife, and
5. Fish and wildlife as a "goal".

The following specific water quality criteria represents the most stringent provisions as established for the above listed water use classifications, and satisfying these criteria should satisfy any of the water quality criteria for any water use designation where there is, or likely to be, industrial waste discharged into the receiving waters.

A. U. S. Public Health Service Drinking Water Standards

If the waters are subjected to treatment approved by the state Department of Public Health as equal to coagulation, sedimentation, filtration and disinfection and meet the "Public Health Service Drinking Water Standards" they will be considered safe for drinking or food-processing purposes. (See separate synopsis for U.S. Public Health Service Drinking Water Standards.)

ALABAMA WATER QUALITY STANDARDS

IV. SPECIFIC WATER QUALITY CRITERIA (CONTD.)

B. Specific Items for State Water Quality

1. Sewage, industrial wastes, or other wastes

   a. None which are not effectively treated or controlled in accordance with II above.

2. pH

   a. Industrial or other wastes shall not cause the pH to deviate more than one unit from normal, nor

   b. be less than 6.0 nor greater than 8.5.

3. Temperature

   a. Maximum temperature rise above normal shall not exceed 5°F in streams, lakes and reservoirs, nor

   b. shall the maximum temperature exceed 90°F.

4. Dissolved Oxygen

For diversified warm water biota, including game fish	≤ 5 mg/l except due to natural causes, may range between 4 mg/l and 5 mg/l
For Coastal Waters	≤ 5 mg/l except for natural conditions
For estuaries and tidal tributaries	≤ 5 mg/l except for natural conditions

5. Toxic substances; color producing substances, heated liquids or any other deleterious substances attributable to sewage, industrial wastes, or other wastes are limited as follows:

   Only such amounts, whether alone or in combination with other substances, and only such temperatures as will not render the waters unsafe or unsuitable as a source of water supply or injurious to fish, wildlife and aquatic life or adversely affect the aesthetic value of waters.

ALABAMA WATER QUALITY STANDARDS

IV. SPECIFIC WATER QUALITY CRITERIA (CONTD.)

B. Specific Items for State Water Quality (Contd.)

6. Fecal Coliform Bacteria

Coastal water	≤100/100 ml	geometric mean
Other waters	≤200/100 ml	geometric mean

7. Radioactivity

None greater than specified by the EPA (USPHS) drinking water standards.

8. Turbidity

50 Jackson units above background.

ALABAMA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Division of Air Pollution Control
of the Department of Public Health

I. General Provisions

A. Definitions

1. "Director" shall mean the Director of the Division of Air Pollution Control of the Department of Public Health which is established by the Act.

2. "Fuel-Burning Equipment" shall mean any equipment, device, or contrivance and all appurtenances thereto, including ducts, breechings, fuel-feeding equipment, ash removal equipment, combustion controls, stacks and chimney, used primarily, but not exclusively, to burn any fuel for the purpose of indirect heating in which the material being heated is not contacted by and adds no substance to the products of combustion.

3. "Fugitive Dust" shall mean solid airborne particulate matter emitted from any source other than a flue or stack.

4. "Opacity" shall mean the obscuration to an observer's view produced by smoke of any color that is equivalent to an obscuration by smoke of a shade specified in the Ringelmann Smoke Chart published by the United States Bureau of Mines.

5. "Particulate Matter" shall mean finely divided material, except uncombined water, which is a liquid or solid at standard conditions of temperature at 70°F and pressure at 14.7 pounds per square inch absolute.

6. "Process" shall mean any action, operation, or treatment of materials, including handling and storage thereof, which may cause discharge of an air contaminant or contaminants into the atmosphere, but excluding fuel burning and refuse burning.

7. "Process Weight" shall mean the total weight in pounds of all materials introduced into any specific process which may cause any discharge into the atmosphere.

8. "Process Weight Per Hour" shall mean the total weight of all materials introduced into any specific process that may cause any discharge of particulate matter. Solid fuels charged will be considered as part of the process weight, but liquid and gaseous fuels and combustion air will not.

9. "Refuse" shall mean matter consisting of garbage, rubbish, ashes, street debris, dead animals, abandoned

I. General Provisions (Contd.)

vehicles, industrial wastes, demolition wastes, construction wastes, special wastes, or sewage treatment residue.

10. "Ringelmann Chart" shall mean the chart published and described in U.S. Bureau of Mines Information Circular 8333.

11. "Source" shall mean any building, structure, facility, installation, article, machine, equipment, device, or other contrivance which emits or may emit any air contaminant. Any activity utilizing abrasives or chemicals for cleaning or any other purpose which emits air contaminants shall be considered a source.

12. "Volatile Organic Compounds" shall mean any compound containing carbon and hydrogen or containing carbon and hydrogen in combination with any other element which has a vapor pressure of 1.5 pounds per square inch absolute or greater under actual storage conditions.

II. Visible Emission Standards

A. Maximum Emissions

1. No. 1 on Ringelmann Chart or 20% opacity, from any single source.

2. Exceptions
   a) No. 3 on Ringelmann Chart or 60% opacity allowed if for periods aggregating not more than 3 minutes in any 60 minute period.
   b) Uncombined water. The standards in this section shall not apply where uncombined water is the only reason for such standards being exceeded.

B. Fugitive Dust Beyond Property Line.

It shall be prohibited to cause or permit the discharge of visible fugitive dust emissions beyond the property line of the emitting source.

III. Standards for Fugitive Dust

A. It shall be prohibited to cause or permit any materials to be handled, transported, or stored, or a building, its appurtenances, or a road to be used, constructed, altered, repaired, or demolished without taking reasonable precautions to prevent particulate matter from becoming airborne. Such reasonable precautions shall include, but not be limited to, the following:

ALABAMA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

III. Standards for Fugitive Dust (Contd.)

1. Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land;

2. Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stock piles, and other surfaces which create airborne dust problems;

3. Installation and use of hoods, fans, and fabric filters (or other suitable control devices) to enclose and vent the handling of dusty materials. Adequate containment methods shall be employed during sandblasting or other similar operations.

B. When dust, fumes, gases, mist, odorous matter, vapors, or any combination thereof escape from a building or equipment in such a manner and amount as to cause a nuisance or to violate any rule or regulation, the Director may order that such building or equipment in which processing, handling, and storage are done be tightly closed and ventilated in such a way that all gases and air or gas-borne material leaving the building or equipment are treated by removal or destruction of air contaminants before discharge to the open air.

IV. Emission Standards for Particulate Matter

A. Fuel Burning Equipment

1. Maximum Emissions

for heat input ≥ 1 MM Btu/hr ≤ 10 MM Btu/hr:
0.5 lb/MM Btu of heat input

for heat input >10 MM Btu/hr <250 MM Btu/hr:

use: $E\ 1.38H^{-0.44}$

where: E is allowable emissions in lb/MM Btu heat input; and
H is heat input in MM Btu/hr

for heat input ≥ 250 MM Btu/hr:
0.12 lb/MM Btu of heat input

2. The total heat input from all similar fuel burning units discharging particulate matter through a common stack at a plant or premises shall determine the maximum allowable emission.

IV. Emission Standards for Particulate Matter (Contd.)

B. Incinerators

1. Maximum Emissions
   for 0 to 50 T/day refuse charging rate:
   0.20 lb/100 lb refuse charged

   for >50 T/day refuse charging rate:
   0.10 lb/100 lb refuse charged

2. The burning capacity (refuse charging rate) of an incinerator shall be the manufacturer's or designer's guaranteed maximum rate or such other rate as may be determined by the Director in accordance with good engineering practice.

3. Maximum emission rates in this section shall be applicable at maximum burning capacity and compliance tests conducted at such capacity. The total of the capacities of all furnaces within one system shall be taken as the incinerator capacity.

C. Process Industries

1. Maximum Emissions
   for process weight rates <30T/hr:

   use $E = 3.59P^{0.62}$

   where: E is allowable emissions in lb/hr; and P is process weight rate in T/hr

   for process weight rates $\geq$30T/hr:

   use $E = 17.31P^{P0.16}$

   where: (E and P are as defined above)

2. The total process weight from all similar process units at a plant or premises shall be used to determine the maximum allowable emission through a stack or stacks.

V. Emission Standards for Sulfur Compounds

A. Definitions

1. A "Category 2 County" shall mean a county in which:

   a) More than 50 percent of the county population resides in a non-urban place, as defined by the U.S. Department of Commerce Census Bureau for 1970.

V. Emission Standards for Sulfur Compounds (Contd.)

b) No Secondary National Ambient Air Quality Standards are being exceeded, based on 1971 air quality measurements.

2. A "Category I County" shall mean a county in which the conditions of either 1.a or 1.b above or both are not met.

B. Process Industries - General

1. Affected facilities: those facilities not regulated by subsections C and D below.

2. Sulfur compound emission sources shall meet all applicable Federal New Source Performance Standards as designated in section XI herein and shall utilize the best available control technology, with consideration being given to the technical practicability and economic reasonableness of emission control techniques.

3. It shall be prohibited for a source to cause or contribute to a condition such that either the primary or secondary SO_2 ambient air quality standards are exceeded in the area of the source.

C. Petroleum Facilities

1. Affected facilities: facilities that handle natural or refinery (process) gas containing more than 0.10 gr H_2S/SCF.

2. H_2S. The emission of an affected process gas stream shall be prohibited unless the stream is burned so as to maintain an H_2S ground level concentration beyond property boundaries of less than 20 ppb averaged over a 30 min period.

a) Determination of ground level concentrations from waste gas or emergency flaring shall be based on the assumption that only 75% of the heat of combustion is used to heat the products of combustion.

3. SO_2. It shall be prohibited to cause or permit emissions from any affected facility to exceed the following SO_2 limitations:

V. Emission Standards for Sulfur Compounds (Contd.)

Category I Counties
(Jackson, Jefferson and Mobile Counties)

Available Sulfur (Long Tons/Day)	Permitted Emissions of Sulfur Dioxide
Up to 5	No Limit
5 to 35	373 lbs/hr
35 to 75	0.10 lbs SO_2/lb S processed
Over 75	0.08 lbs SO_2/lb S processed

Category II Counties (All Other)

Available Sulfur (Long Tons/Day)	Permitted Emissions of Sulfur Dioxide
Up to 10	No Limit
10 to 50	560 lbs/hr
50 to 100	0.10 lbs SO_2/lb S processed
Over 100	0.08 lbs SO_2/lb S processed

The allowable emissions of sulfur dioxide shall be increased as follows to allow for dry acid gas streams containing less than 60 % H_2S:

Mol. % H_2S in Dry Acid Gas	Additional SO_2 Emissions Allowed
50% but less than 60%	.02 lbs SO_2/lb S processed
40% but less than 50%	.04 lbs SO_2/lb S processed
30% but less than 40%	.06 lbs SO_2/lb S processed
20% but less than 30%	.10 lbs SO_2/lb S processed
Less than 20%	Must utilize the best available control technology, with consideration to the technical practicability and economic reasonableness of reducing or eliminating emissions from the facility.

4. Additional Requirements. In addition to the requirements of C.3, it shall be demonstrated, to the satisfaction of the Director, that the sulfur oxides emitted either alone or in conjunction with other sources will not interfere with attainment and maintenance of any primary or secondary ambient air quality standard.

V. Emission Standards for Sulfur Compounds (Contd.)

D. Fuel Burning Equipment (Fuel Combustion Sources)

1. Maximum SO_x Emissions (expressed as SO_2)

Category I County:	Category II County:
1.8 lb/MM Btu heat input	4.0 lb/MM Btu heat input

2. Additional Requirements. In addition to the requirements of D.1 fuel burning installations having a total rated capacity greater than 1500 million Btu per hour shall be required to:

   a) Demonstrate to the satisfaction of the director that the sulfur oxides emitted either alone or in contribution to other sources will not interfere with attainment and maintenance of any primary or secondary ambient air quality standard for sulfur oxides.
   b) Demonstrate to the satisfaction of the director that in meeting the emission limitations of D.1. the installation will not increase emissions to the extent that resulting concentrations will be greater than:
      (i) those concentrations (measured or calculated) which existed in 1970; or
      (ii) those concentrations (measured or calculated) which existed during the first year of operation of any installation which began operating after January 1, 1970.

3. For purposes of this subsection D, the total heat input from all similar fuel combustion units at a plant or premises shall be used for determining the maximum allowable emission of sulfur dioxide that passes through a stack or stacks. Units constructed and operated to conform with the New Source Performance Standards (Section XI) shall not be considered similar to other units at a plant or premises.

4. All calculations relating to demonstrations required by D.2. shall assume that the fuel burning installation is operating at or above the maximum capacity for such installation.

5. H_2S. It shall be prohibited to cause or permit the emission or combustion of any refinery process gas stream that contains an H_2S concentration greater than 150 ppm without removal of the hydrogen sulfide in excess of 150 ppm.

ALABAMA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

VI. Emission Standards for Nitrogen Oxides (NO_x)

A. Fuel Burning Equipment (Combustion Sources)

1. Affected facilities: Any boiler with a capacity of 250 MM Btu/hr or greater

2. Maximum Emission - Gas Fired
   0.20 lb/MM Btu of heat input

3. Maximum Emission - Oil Fired
   0.30 lb/MM Btu of heat input

4. Maximum Emission - Coal Fired
   0.70 lb/MM Btu of heat input

5. The total heat input from all similar fuel combustion units at a facility or plant shall be used for determining the maximum allowable emission of NO_x through a stack or stacks.

VII. Emission Standards for Carbon Monoxide (CO)

A. Petroleum Processes

1. It shall be prohibited to emit any waste gas stream containing CO from any catalyst regeneration of a petroleum cracking system, petroleum fluid coker, or other petroleum process unless such waste gas stream is burned at 1300°F for 0.3 sec or longer in a direct-flame afterburner or boiler equipped with an easily accessible indicating pyrometer.

VIII. Odorous Emission Standards

A. Incinerators

1. Incinerators shall be designed and operated in such manner as necessary to prevent emission of objectionable odors.

IX. Emission Standards for Hydrocarbons

A. Definitions

1. For the purposes of this part, organic solvents include diluents and thinners and are defined as organic materials which are liquids at standard conditions and which are used as dissolvers, viscosity reducers, or cleaning agents.

IX. Emission Standards for Hydrocarbons (Contd.)

2. For the purposes of this part, organic materials are defined as chemical compounds of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate.

3. For the purposes of this part, a photochemically reactive solvent is any solvent with an aggregate of more than 30 percent of its total volume composed of the chemical compounds classified below or which exceeds any of the following individual percentage composition limitations, referred to the total volume of solvent:

a) A combination of hydrocarbons, alcohols, aldehydes, esters, ethers, or ketones having an olefinic or cyclo-olefinic type of unsaturation: 5 percent;
b) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene: 8 percent;
c) A combination of ethylbenzene, ketones having branched hydrocarbon structures, or toluene: 20 percent.

Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percent of the total volume of solvents.

B. Applicability

The provisions of section IX. shall apply statewide, except that subsections F. and G. shall only apply to Mobile County.

C. Storage of Volatile Organic Materials

1. It shall be prohibited to place, store, or hold in any stationary tank reservoir or other container of more than 60,000 gallons capacity any volatile organic compounds unless such tank, reservoir, or other container is a pressure tank capable of maintaining working pressures sufficient at all times to prevent vapor or gas loss to the atmosphere or is designed and equipped with one of the following vapor loss control devices:

IX. Emission Standards for Hydrocarbons (Contd.)

a) A floating roof, consisting of a pontoon type, double deck type roof or internal floating cover, which will rest on the surface of the liquid contents and be equipped with a closure seal or seals to close the space between the roof edge and tank wall. This control equipment shall not be permitted if the volatile organic compounds have a vapor pressure of 11.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging or sampling devices shall be gas-tight except when tank gauging or sampling is taking place.

b) A vapor recovery system consisting of a vapor gathering system capable of collecting the volatile organic compound vapors and gases discharged and a vapor disposal system capable of processing such volatile organic vapors and gases so as to prevent their emission to the atmosphere. All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

c) Other equipment or means of equal efficiency for purposes of air pollution control as may be approved by the Director.

d) It shall be prohibited to place, store, or hold in any new stationary storage vessel of more than 1,000 gallons capacity any volatile organic compound unless such vessel is equipped with a permanent submerged fill pipe, or is a pressure tank as described in paragraph a) above or is fitted with a system as described in paragraph b) above.

D. Volatile Organic Materials Loading Facilities

1. It shall be prohibited to load any volatile organic compounds into any tank, truck or trailer from any terminal or bulk storage facility handling more than 50,000 gallons per day unless such terminal or facility is equipped with a vapor collection and disposal system or its equivalent, properly installed and in good working order, or has in operation a loading system which will result in a 95 percent submerged fill either with a submerged fill pipe or by loading from the bottom.

2. It shall be prohibited to load any volatile organic compounds into any tank, truck, or trailer having a capacity in excess of 200 gallons unless such loading facility is equipped as set forth in D.1. above. Where the vapor collection and disposal system is utilized,

IX. Emission Standards for Hydrocarbons (Contd.)

the loading arm shall be equipped with a vapor collection adaptor, pneumatic, hydraulic, or other mechanical means which will provide a vapor-tight seal between the adaptor and the hatch. A means shall be provided to prevent liquid organic compounds drainage from the loading device when it is removed from the hatch of any tank, truck, or trailer. When loading is effected through means other than the hatches, all loading lines shall be equipped with fittings which make vapor-tight connections and which close automatically when disconnected.

E. Volatile Organic Compound - Water Separation

1. It shall be prohibited to use any compartment of any single or multiple compartment volatile organic compound water separator which receives effluent water containing 1,000 gallons a day or more of any volatile organic compound unless such compartment is equipped with one of the following vapor loss control devices in good working order:

   a) A container having all openings sealed and totally enclosing the liquid contents. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.
   b) A container equipped with a floating roof, consisting of a pontoon type, double deck type roof, or internal floating cover, which will rest on the surface of the contents and be equipped with a closure seal or seals to close the space between the roof edge and container walls. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.
   c) A container equipped with a vapor recovery system consisting of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere and with all container gauging and sampling devices gas-tight except when gauging or sampling is taking place.
   d) A container having other equipment of equal efficiency for purposes of air pollution control as may be approved by the Division.

IX. Emission Standards for Hydrocarbons (Contd.)

F. Pumps and Compressors (Mobile County only)

All pumps and compressors handling volatile organic compounds shall have mechanical seals or other equipment of equal efficiency for purposes of air pollution control as may be approved by the Division.

G. Organic Solvents (Mobile County only)

1. It shall be prohibited to discharge into the atmosphere more than 15 pounds of organic materials in any one day nor more than 3 pounds in any one hour from any article, machine, equipment, or other contrivance in which any organic solvent or any material containing organic solvent comes into contact with flame or is heat-cured or heat-polymerized in the presence of oxygen unless said discharge has been reduced by at least 85 percent.

2. It shall be prohibited to discharge into the atmosphere more than 40 pounds of organic materials in any one day or more than 8 pounds in any one hour from any article, machine, equipment, or other contrivance used under conditions other than described in G.1 above for employing, or applying, any photochemically reactive solvent, as defined in A.3 above; or material containing such photochemically reactive solvent, unless said discharge has been reduced by at least 85 percent. Emissions resulting from heat-curing or heat-polymerizing as described in G.1 shall be excluded from determination of compliance with this section.

3. Emissions of organic materials into the atmosphere required to be controlled by G.1. and G.2. above shall be reduced by:

   a) Incineration, provided that 90 percent or more of the carbon in the organic material being incinerated is oxidized to carbon dioxide, or
   b) Adsorption, or
   c) Processing in a manner determined by the Division to be not less effective than a) or b) above.

4. The provisions of this Part shall not apply to:

   a) The transport or storage of organic solvents or materials containing organic solvents.
   b) The employment, application, evaporation, or drying of saturated halogenated hydrocarbons or organic compounds in which all olefinic groups contain 3 or more halogen atoms.

IX. Emission Standards for Hydrocarbons (Contd.)

c) The use of any material in an article, machine, or equipment described in G.1 and G.2 if:
  (i) The volatile content of such material consists only of water and organic solvents, and
  (ii) The organic solvents comprise not more than 20 percent of said volatile content, and
  (iii) The volatile content is not photochemically reactive as defined in A.3.

d) Coatings applied to permanently located structures or surfaces.

H. Disposal of Organic Solvents

It shall be prohibited to dispose of, during any one day, a total of more than 1.5 gallons of any photochemically reactive solvent as defined in A.3 or of any material containing more than 1.5 gallons of any such photochemically reactive solvent by any means which will permit the evaporation of such solvent in the atmosphere.

X. Emission Standards for Hazardous Air Pollutants

A. Definitions

1. "Mercury" means the element mercury, excluding any associated elements, and includes mercury in particulates, vapors, aerosols, and compounds.

2. "Beryllium" means the element beryllium. Where weight or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any associated elements.

B. Standards

1. Regulations for certain substances covered in the National Emission Standards for Hazardous Air Pollutants (40 CFR, Part 61) are incorporated by reference in Alabama air regulations. Of these incorporated regulations the regulation for Mercury emissions and Beryllium emissions are relevant to this project. Synopses of the Federal regulations for mercury and beryllium, a designated Hazardous Air Pollutants, may be found in the "Federal EPA Regulations and Standards" portion of this report.

XI. Standards for New Stationary Sources

A. Designated Federal regulations for new stationary emission sources (40 CFR, Part 60) are incorporated by reference

ALABAMA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

XI. Standards for New Stationary Sources (Contd.)

with minor administrative changes. The portions of these Federal regulations relevant to this project have been synopsized herein and this synopsis may be found under the "Federal EPA Regulations and Standards" portion of this report.

B. Designated Standards

The Federal regulations incorporated which are relevant or partially relevant to fossil-fuel conversion facilities within the scope of this project cover the following listed plants or facilities:

1. Fossil-fuel fired steam generators (40 CFR, Part 60, Subpart D).
2. Incinerators (40 CFR, Part 60, Subpart E).
3. Storage Vessels for Petroleum Liquids (40 CFR, Part 60, Subpart K).
4. Petroleum Refineries (40 CFR, Part 60, Subpart J).
5. Coal Preparation Plants (40 CFR, Part 60, Subpart Y).

ALABAMA SOLID WASTE REGULATIONS

Basis: (1) Solid Waste Disposal Act, No. 771, 1969, as amended by Act No. 2247, 1971.

(2) Alabama Rules and Regulations for Solid Waste Management.

Agency: Alabama Department of Public Health, Bureau of Environmental Health.

Notes: (1) State legislation for hazardous wastes management is pending , however, as of March 30, 1977, a hazardous waste survey had not been accomplished.

(2) Management of potentially hazardous wastes is handled on a case-by-case basis.

I. Applicability

The Act was intended to apply to all who generate, or assume responsibility for the management of solid wastes in the State of Alabama. The rules and regulations are, therefore, for general application throughout the State.

II. Disposal of Solid Waste

The disposal of solid waste shall be by the following approved methods or any combinations thereof:

A. Sanitary landfill;

B. Incineration; or

C. By other methods which fulfills the basic requirements of these rules and regulations and where such methods have been approved by the Department.

III. Approval

No agency or person shall establish or operate a solid waste disposal facility without first obtaining approval for site location from the Department.

IV. Exceptions

A. The Solid Waste Disposal Act, as last amended, provides for the requirements of a business, industry or any property owner who chooses to store, haul or dispose of his own solid wastes on his own land or otherwise.

IV. Exceptions

B. If the person involved is a business, industry or property owner generating wastes in substantial amounts in excess of that generated by an individual householder, certificates of exception may be granted by the Department on receipt of approved plans for storage, hauling and disposal.

ALASKA WATER QUALITY STANDARDS

Basis: Water Quality Standards, 18AAC, Chapter 70 (October 1973); Chapter 72.

Agency: Department of Environmental Conservation

Note: (1) The Department of Environmental Conservation indicated by letter of June 15, 1977 that the Water Quality Standards may be revised in late 1977 or early 1978.

I. GENERAL

A. Minimum Treatment

1. All industrial waste discharges are required to have treatment which is equivalent to best practicable control technology currently available as shall be defined for each industrial waste.
2. Where this best practicable control technology currently available is inadequate to achieve the water quality criteria as listed below, the Department will require higher levels of treatment.

B. Establishment of water use classifications and criteria are as follows:

1. Class A - Water supply without the need for treatment other than simple disinfection and simple removal of naturally present impurities;
2. Class B - Water supply with the need for treatment equal to coagulation, sedimentation, filtration, disinfection and any other treatment process necessary to remove naturally present impurities;
3. Class C - Water contact recreation;
4. Class D - Growth and propagation of fish;
5. Class E - Shell fish growth and propagation;
6. Class F - Agricultural water supply; and
7. Class G - Industrial water supply (other than food processing).

II. SPECIFIC WATER QUALITY CRITERIA

Listed below are the water quality criteria for two water use classifications to illustrate what in all probability, would

ALASKA WATER QUALITY STANDARDS

II. SPECIFIC WATER QUALITY CRITERIA (CONTD.)

represent the most stringent and least stringent receiving water quality parameters.

A. Class A Waters (See I.B.1 Above)

1.	Coliform Bacteria	≤50/100 ml (mean of 5 or more samples in any month)
2.	Dissolved Oxygen	≥5 mg/l
3.	pH (range)	6.5 - 8.5
4.	Turbidity (Jackson Turbidity Units - JTU)	≤5 JTU
5.	Temperature	60°F
6.	Dissolved Inorganic Substances (total from all sources)	500 mg/l
7.	Residues (including oils, floating solids, sludge deposits and other wastes)	None which would make receiving water unsafe for the use or interfere with the water use.
8.	Sediment	Below normally detectable amounts
9.	Toxic or other deleterious substances and related Organic and Inorganic materials Carbon Chloroform Extracts	<0.1 mg/l, and other chemical constituents may not exceed U.S. Public Health Service Drinking Water Standards, 1962 (USPHS)
10.	Color (measured in Color Units)	15 Color Units (true color)
11.	Radioactivity	Coforms with USPHS Drinking Water Standards
12.	Aesthetic Considerations	No substances which are offensive to the sight, smell, taste or touch.

ALASKA WATER QUALITY STANDARDS

II. SPECIFIC WATER QUALITY CRITERIA (CONTD.)

B. Class G Waters (See I.B.7 Above)

1. Coliform Bacteria (where worker contact is present)	<1000/100 ml (mean of 5 or more samples per month) and not more than 20% of the samples during one month may exceed 1000/100 ml
2. Dissolved Oxygen	>5 mg/l
3. pH (range)	6.5 - 8.5
4. Turbidity (Jackson Turbidity Units)	No imposed turbidity that may interfere with established levels of water supply treatment
5. Temperature	<70°F
6. Dissolved Inorganic Subtances	No amount above natural conditions which may cause undue corrosion, scaling, or process problems.
7. Residues (including oils, floating solids, sludge deposits and other wastes)	No visible evidence of residues
8. Sediment	No imposed loads that will interfere with established levels of treatment
9. Toxic or other deleterious substances, and related Organic and Inorganic materials	Chemical constituents may not exceed concentrations found to be of public health significance
10. Color (measured in color units)	True color less than 50 color units
11. Radioactivity	Conforms with USPHS Drinking Water Standards, 1962
12. Aesthetic Considerations	No substances which are offensive to sight, smell, taste or touch

III. WASTEWATER DISPOSAL

A. Surface Waste Disposal Restrictions

1. A waste disposal permit is required before any operation is conducted which results in the disposal of wastewater into or upon the waters of the state or surface of the land.

2. No wastewater or other wastes may be discharged which results in a violation of the state's water quality standards.

3. Discharges containing oil, petroleum products, or industrial solvents to a sewerage system designed to contain only sewage or storm water are prohibited.

B. Pretreatment

1. It may be required that industrial liquid wastes or other waste discharged, or planned to be discharged, to a public sewerage system or treatment works receive pretreatment to prevent damaging effect to the treatment work or receiving waters.

C. Plan Review

1. No person may construct, alter, or modify a sewerage system or treatment works until detailed engineering reports, plans and specifications are submitted to, and approved, by the department.

2. The engineering reports, plans and specifications shall be certified by a professional engineer registered in the State of Alaska.

ALASKA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Department of Environmental Conservation

I. General Provisions

A. Definitions

1. "Fuel burning equipment" means any combustion device or part thereof capable of emission, but excludes mobile internal combustion engines, incinerators, marine vessels, and indoor fireplaces.

2. "Incinerator" means any equipment, device or contrivance, excluding indoor fireplaces, used for the thermal reduction of garbage or other wastes.

3. "Particulate matter" means any material, except water, which is, or has been, airborne and exists as a liquid or a solid at standard conditions.

4. "Opacity" means the characteristic of a substance which renders it partially or wholly impervious to transmittance of light and causes obstruction of an observer's view.

B. In areas where existing air quality is better than ambient air quality standards, the Department shall enforce applicable emission standards so as to minimize degradation of air quality .

C. No person may permit any emission which is injurious to human health or welfare, animal or plant life or property, or would unreasonably interfere with the enjoyment of life or property.

D. The use of air for dilution of emission contaminants without affecting any total decrease in such contaminants shall not be permitted as a method to effect compliance with these standards.

E. A local air quality control agency may establish the same or more stringent regulations, but not less stringent regulations than those herein for the State of Alaska.

II. Visible Emission Standards

A. Industrial Processes and Fuel Burning Equipment

1. Maximum emissions

Not to exceed 20% opacity (excluding condensed water vapor) for periods aggregating over three minutes in any hour.

II. Visible Emission Standards (Contd)

B. Incinerators

1. Affected facilities: all incinerators, including air curtain incinerators.

2. Definitions

a) "Air curtain incinerator" means an incinerator in which large quantities of combustible materials are burned in a rectangular container which is equipped with an overfire air system.

3. Maximum emissions

Not to exceed 20% opacity (excluding condensed water vapor) for periods aggregating over three minutes in any hour.

III. Emission Standards for Particulate Matter

A. Industrial Processes and Fuel Burning Equipment

1. Maximum emissions
0.05 gr/SCF of exhaust gas

2. Exception

a) Maximum emission for fuel burning equipment using coal or municipal waste as fuel:
0.1 gr/SCF of exhaust gas

B. Incinerators

1. Maximum emissions
(with exhaust gas corrected to 12% CO_2)

$\leq$ 200 lbs/hr rated capacity: 0.3 gr/SCF of exhaust gas,

> 200 $\leq$1000 lbs/hr rated capacity: 0.2 gr/SCF exhaust, gas

> 1000 lbs/hr rated capacity: 0.1 gr/SCF exhaust gas.

IV. Standards for Fugitive Dust

A. It shall be prohibited to cause or permit bulk materials to be handled, transported or stored without taking reasonable precautions to prevent particulate matter from becoming airborne.

ALASKA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

V. Standards for Ice Fog

A. The Department may require any person proposing to build or operate an industrial process, fuel burning equipment, or an incinerator in an area of potential ice fog to obtain a permit to operate and to reduce water emissions.

VI. Emission Standards for Sulfur Compounds

A. Industrial Processes or Fuel Burning Equipment

1. Maximum Emissions of Sulfur Compounds
500 ppm (expressed as SO_2; by vol.)

ALASKA SOLID WASTE MANAGEMENT REGULATIONS

Basis: Title 18, Environmental Conservation, Chapter 60 Solid Waste Management (18 AAC 60.020, October 1973)

Agency: Department of Environmental Conservation

I. Solid Waste Management Permit

A. No person may establish, modify or operate a solid waste disposal facility without a permit.

II. Disposal on Land

A. The disposal of solid waste on the land shall comply with the following requirements:

1. Disposal of putrescible waste in areas subject to permafrost or leachate generation is restricted and shall be allowed only in conjunction with special procedures approved by the Department;
2. Open burning on a landfill is prohibited;
3. Solid waste shall be deposited in a manner to prevent waste materials, leachate or eroded soil particles from entering the waters of the state;
4. A minimum separation of two feet shall be maintained between putrescible solid waste and the anticipated high ground water table;
5. Surface water drainage from areas outside a landfill shall not be allowed to flow over or through a landfill;
6. Solid waste shall be spread in shallow layers not exceeding a depth of two feet prior to compaction; and
7. Solid waste shall be compacted and covered with earth or other approved material at a frequency specified by the permit requirement.

III. Incineration

A. No person may use an incinerator facility for solid waste processing that has a total rated capacity equal

III. Incineration (Contd.)

to or greater than 200 pounds per hour unless it complies with the following:

1. The incinerator shall be designed and operated so the emitted air contaminants, including odors, gases and particulate matter do not exceed the established standards.

2. The Department must inspect the incinerator facility prior to initial operation.

IV. Hazardous Waste

A. Specific approval for the processing and disposal of hazardous wastes must be obtained from the Department.

V. Definitions

A. "Hazardous Waste" means waste that is capable of causing injury, disease or impairment of health, or property damage, including but not limited to poisions, pesticides, acids, caustics, infectious or pathological wastes, radioactive materials, explosive materials, and oil and petroleum products.

B. "Solid waste disposal facility" means an intermediate disposal facility, transfer station, landfill, incinerator, composting plant, recycling or reclamation facility or any site utilized for the reduction, consolidation, conversion, processing or disposal of solid waste.

C. "Leachate" means water that has percolated through solid waste and contains dissolved or suspended portions from the solid waste.

COLORADO WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS

Basis: 1. Water Quality Standards for Colorado (June 1974)
2. Regulations for Effluent Limitations (August 1975)

Agency: Colorado Department of Health, Water Quality Control Commission

I. WATER QUALITY STANDARDS

Note: The following water quality criteria represents the most stringent provisions as specified for the water use classifications, and by restricting effluent emissions so as to not cause the receiving water to exceed the standards shown below should satisfy any of the water quality for the state for any water use designation.

A. Standards applicable to all state waters

1. No settleable material which would form objectionable sludge deposits;

2. No floating debris, scum, and other floating materials which would be unsightly or deleterious;

3. No materials which would produce color, odor or other conditions in amounts so as to create a nuisance;

4. No substances, either alone or in combinations, in concentrations which are toxic to human, animal, plant, or aquatic life;

5. No substances or conditions in concentrations which would produce undesirable aquatic life;

6 Free from residues attributable to wastewater or visible film oils or globules of grease, which are present in concentrations which cause a film, other discoloration of the surface, or which cause an emulsion to be deposited beneath the surface of the water or upon adjoining shorelines or which prevent classified uses of such waters.

7. The radioactivity of surface waters shall be maintained at the lowest practical level and shall in no case, except when due to natural causes, exceed the latest Federal Drinking Water Standard as established by the United States Public Health Service, the Environmental Protection Agency or their successor.

COLORADO WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS

I. WATER QUALITY STANDARDS (CONTD.)

B. Specific Water Quality Criteria (Not addressed in I above)

Substance or Condition	Limitations
Fecal Coliform Bacteria	≤200/100 ml-Geometric Mean from five samples in 30 day period.
Turbidity	≤10 Jackson Unit increase
Dissolved Oxygen	≥6 mg/l
pH (range)	6.5 - 8.5
Temperature	Maximum change 2°F

II. EFFLUENT LIMITATIONS

A. Applicability

These regulations pertain to all wastewater discharges into any state waters.

1. Exceptions

   a. Agricultural return flows, and
   b. Storm runoff waters

B. Specific Limitations for Waste Discharges

Substance	Effluent Limitations	
	7-Day Average	30-Day Average
BOD5	≤45 mg/l	≤30 mg/l
Suspended Solids	≤45 mg/l	≤30 mg/l
Fecal Coliform	Determined in accordance with stream classification to which the discharge is made.	
Residual Chlorine	<0.5 mg/l	
pH (range)	6.0 - 9.0	
Oil and Grease	≤10 mg/l - No visible sheen	

Note: If wastewater is returned to the source from which it was obtained the limitations specified above are in addition to the measured values of the same parameters in the incoming water.

COLORADO: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Colorado Department of Health, Air Pollution Control Division

I. General Provisions

A. Definitions

1. "Air contaminant" means any fume, smoke, particulate matter, vapor, gas, or any combination thereof, but not including water vapor or steam condensate.

2. "Division" means the Division of Air Pollution Control, Colorado Dept. of Health.

3. "Fossil fuel" means natural gas, petroleum, coal and any form of solid, liquid, or gaseous fuel derived from such materials.

4. "Fuel burning equipment" means any furnace, boiler apparatus, stack, or appurtenances thereto used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer.

5. "Fugitive dust" means solid airborne particulate matter emitted from any source other than an opening which channels the flow or air contaminants and then exhausts the contaminants directly into the atmosphere. Fugitive dust also includes solid particles released into the atmosphere by natural forces or by mechanical processes such as crushing, grinding, milling, drilling, demolishing, shoveling, conveying, covering, bagging, sweeping, etc.

6. "Incinerator" means any furnace used in the process of burning solid waste for the primary purpose of reducing the volume of the waste by removing combustible matter.

7. "Opacity" means the degree to which an air contaminant emission obscures the view of an observer, expressed in percentage of the obscuration, or in the degree (percent) to which transmittance of light is reduced by an air contaminant emission.

8. "Particulate matter" means any material, except uncombined water, that exists in a finely divided form as a liquid or solid.

9. "Process or process equipment" means any action, operation, or treatment, involving chemical, industrial, or manufacturing factors, such as heat-treating furnaces, by-product coke plants, coke-baking ovens, mixing kettles, cupolas, blast

I. General Provisions (Contd.)

furnaces, open hearth furnaces, heating and reheating furnaces, ferrous and non-ferrous foundries, kilns, stills, dryers, roasters, and equipment used in connection therewith, and all other methods or forms of manufacturing or processing that may emit air contamination.

10. "Solid waste" means refuse, more than 50 percent of which is municipal type waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber and other combustibles, and noncombustible materials such as glass and rock.

II. Visible Emission Standards

A. Maximum Emissions
20% opacity

B. Exceptions

1. Visible emissions from pilot plants and experimental operations, for a period not to exceed 180 operating days cumulative total from the initial date of operations, shall have the following limitations:

Maximum Emissions
40% opacity, for periods aggregating not more than three minutes in any 60 consecutive minutes

2. During the building of a new fire, cleaning of fires, soot blowing, startup, any process modification or adjustment, or occasional cleaning of control equipment the following limitations shall apply:

Maximum Emissions
40% opacity, for periods aggregating not more than 3 minutes in any one hour

C. Opacity Regulations for Fugitive Dust Emissions (see III.A)

III. Emission Standards for Fugitive Dust

A. Visible Emission Standards

1. Standards for any source of fugitive dust

a) Maximum Emission (at or from source)
20% opacity

III. Emission Standards for Fugitive Dust (Contd.)

b) Particulate matter which is visibly transported off the source premises and remains visible to an observer off such premises when sighting along a line not crossing the property of emission origination shall be prohibited.

2. Exceptions to Standards in A.1.

a) Sources covered by other fugitive dust standards of this section. These include:
   - i) unpaved roads and unpaved parking areas (see III.B).
   - ii) earth and construction material moving and excavating activities except for crushing, grinding, milling, conveying, and bagging processes. (see III.C.).
   - iii) Demolition, wrecking, and moving of structures and explosives detonation activities. (see III.D.).
   - iv) open mining activities. (see III.E.)

b) Sources of fugitive dust which exceed opacity regulations for a period or periods aggregating less than 3 minutes in any 60 consecutive minutes.

c) Sources of fugitive dust exceeding opacity regulations when wind velocities exceed 30 mph as determined by practices designated and approved by the Division.

d) Other sources as may be specified by the Commission.

B. Unpaved Roads and Unpaved Parking Areas

1. Abatement and preventive measures as outlined in III. F. herein shall be used during construction. [With a few minor exceptons new roads and parking areas require construction and operating permits, each of which contains standards for the control of fugitive dust specifically for the project such permit is issued for.]

C. Earth and Construction Material Moving and Excavating (not including crushing, grinding, milling, conveying, and bagging processes).

1. No developer of a construction or land development project shall, throughout the duration of the project, disturb or contract to disturb by grading, excavating or depositing on more total surface area than five acres of land in the aggregate unless abatement and preventive measures as outlined in subsection F are met continually.

III. Emission Standards for Fugitive Dust (Contd.)

[New regulated sources require permits which contain additional requirements specific to the project.]

D. Demolition, Wrecking, and Moving of Structures and Explosives Detonation Activities.

1. No person shall conduct demolition, wrecking, or moving of structures or explosives detonation activities unless the provisions of III. F. are met continually. [These sources require permits containing additional requirements specific to the project.]

E. Open Mining Activities

No developer of an open mining activity shall, throughout the duration of the operation, disturb or contract to disturb by grading, excavating, or depositing a total land surface area of more than one acre in the aggregate unless provisions of III. F. are met continually. Open mining shall mean the mining of natural mineral deposits, limestone, coal, sand gravel, and quarry aggregate, by removing the overburden lying above such deposits and mining directly from the deposits thereby exposed. The term includes, but is not limited to, such practices as open cut mining, open pit mining, strip mining, quarrying, and dredging. [Additional requirements specific to the project are contained in the required permit.]

F. Required Abatement and Preventive Measures

1. Unpaved Roads and Unpaved Parking Areas.
   a) Abatement and preventive measures shall be approved by the Division and may include but shall not be limited to frequent watering, addition of dust palliatives, detouring, paving, closure, speed control, or other means such as surface treatment with penetration chemicals (ligninsulfonates, oil, water, cutbacks, etc.) or methods of equal or greater effectiveness in reducing the air contamination produced.

2. Demolition, Wrecking and Explosive Detonation Activities; Earth and Construction Material Moving, Mining and Excavation Activities.
   a) Abatement and preventive fugitive dust control measures shall be approved by the Division and may include, but shall not be limited to:

      . wetting down, including pre-watering;
      . landscaping and replanting with native vegetation;

III. Emission Standards for Fugitive Dust (Contd.)

- covering, shielding or enclosing the area;
- paving (temporary or permanent);
- treating, the use of dust palliatives and chemical stabilization;
- detouring;
- restriction of the speed of vehicles on sites;
- prevention of the deposit of dirt and mud on improved streets and roads; and other such effective means of dust control as the Division may deem necessary;
- disturbing less topsoil and reclaiming as soon as possible.

b) Sequential blasting shall be employed whenever or wherever feasible to reduce the amounts of unconfined particulate matter;

c) Such dust control strategies as revegetation, delay of surface opening until demanded, or surface compaction and sealing, shall be applied.

d) Haulage equipment shall be washed or wetted down, treated, or covered when necessary to minimize the amount of dust emitted in transit and in loading.

e) The measures in this subsection F.2. shall also be enforced during periods when actual construction work is not being conducted, such as on weekends and holidays.

IV. Emission Standards for Particulate Matter

A. Maximum Emissions from Fuel-Burning Equipment

1. Single units.

$\leq$ 1 MM Btu/hr fuel input: 0.5 lb/MM Btu heat input

$>$ 1 MM Btu/hr $\leq$500 MM Btu/hr:

use formula: $PE = 0.5\ (FI)^{-0.26}$

where: PE is particulate emissions in lb/MM Btu;
FI is fuel input in MM Btu/hour

$>$500 MM Btu/hr: 0.1 lb/MM Btu

2. Multiple Units.

Where 2 or more units connect to any opening, each separate unit shall have the same maximum emission rate as determined using IV. A. 1. above for single units and the total for the combined facility shall be equal to the sum of all separate unit rates.

IV. Emission Standards for Particulate Matter (Contd.)

B. Maximum Emissions from Incinerators.

1. Inside designated air pollution control areas:

   0.10 gr/SCF (Dry) flue gas, corrected to 12% CO_2

2. Outside designated air pollution control areas:

   0.15 gr/SCF (Dry) flue gas, corrected to 12% CO_2

C. Maximum Emissions from Manufacturing Processes

1. Process Weight Rates <30 tons/hr

   Use: $E=3.59P^{0.62}$

   Where: E is maximum emission in lb/hr, and
   P is process weight rate in tons/hr

2. Process Weight Rates >30 tons/hr

   Use: $E = 17.31P^{0.16}$

   Where: (E and P are as defined in C.1. above.)

V. Emission Standards for Sulfur Dioxide and Sulfur Compounds

A. General

1. Standards for Compounds with Sulfur in Oxidized States
   a) For the purposes of this regulation all oxidized forms of sulfur (including but not restricted to sulfur trioxide (SO_3), thionyl chloride ($SOCl_2$), sulfuric acid mist (H_2SO_4) shall be considered as sulfur dioxide. The standards herein for SO_2 shall be applied to such compounds after converting them on a molar basis to equivalent SO_2 and totalling all such equivalent moles for the entire gaseous emission stream or source.

2. Also see section IX for standards limiting certain sulfur compounds in new stationary sources (fossil-fuel fired steam generators and petroleum refineries - IX.A.3. and IX.C.5., respectively).

B. Current Sulfur Dioxide (SO_2) Standards for Process Units.

1. Maximum Concentration of SO_2 in Emissions
   500 ppm (by vol.)

V. Emission Standards for Sulfur Dioxide and Sulfur Compounds (Contd.)

C. Sulfur Dioxide Standards for Process Units - to be effective on Jan. 1, 1985.

1. Maximum Concentration of SO_2 and Rate of Emissions
500 ppm (by vol.)

and: Emissions of not greater than 5 tons SO_2 per day from any process unit (applies only to SO_2 concentrations of 150 ppm by vol. or more).

2. Any sources to be constructed or contracted for construction after Jan. 1, 1980 shall meet the 1985 standards in C.1. above.

VI. Standards for Odorous Emissions

A. Standards for land areas used predominantly for residential or commercial purposes:
Odors not to be detectable after air sample diluted with 7 volumes or more of odor free air.

B. Standards for all land area usage other than as in subsection A:
Odors not to be detectable after air sample diluted with 15 volumes or more of odor free air.

C. Exceptions.

1. In the case of manufacturing processes, no violation of this regulation shall occur if the best practical control method currently available is installed and utilized for abatement of the emission.

2. Regardless of area, however, an emission shall be in violation of this regulation when odors are detected in an emission sample diluted with 127 volumes or more of odor free air.

VII. Emission Standards for Hydrocarbon Vapors

A. Standards for Waste Gas Disposal.

1. Hydrocarbon vapors from blowdown systems or emergency relief valves: shall be burned in smokeless flares or Division approved equipment of equal efficiency.

B. Standards for Organic Solvents

1. Definitions

VII. Emission Standards for Hydrocarbon Vapors (Contd.)

a) For the purposes of this subsection B. organic materials are defined as chemical compounds of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate.

b) For the purposes of this subsection B. organic solvents include diluents and thinners and are defined as organic materials which are liquids at standard conditions and which are used as dissolvers, viscosity reducers and cleaning agents.

c) For the purposes of this subsection B. a photochemically reactive solvent is any solvent with an aggregate of more than 20% of its total volume composed of the chemical compounds classified below or which exceeds any of the following individual percentage composition limitations, referred to the total volume of solvent.

i) A combination of hydrocarbons, alcohols, aldehydes, esters, ethers, or ketones having an olefinic or cyclo-olefinic type of unsaturation: 5%

ii) A combination of aromatic compounds with eight or more carbon atoms to the molecule, except ethylbenzene: 8%

iii) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene: 20%.

Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group; that is, that group having the least allowable percent of the total volume of solvents.

[Colorado Air Regulation No. 7 includes a table of "Photochemical Reactivity of Common Solvents" which shows the category i)-iii) above in which each listed solvent fits or that the solvent may be used in all percentages.]

2. Affected facilities and substances.

a) Emissions of organic materials to the atmosphere from the clean-up, with photochemically reactive solvent as defined in subsection B.1.c) of any article, machine, equipment, or other contrivance described in subsections B.3.a)-c) shall be included with the other emissions of organic materials from that article, machine, equipment, or other contrivance for determining compliance with this Section B.

3. Emission Standards

a) It shall be prohibited to discharge into the atmosphere more than 15 pounds of organic materials in any one day, nor more than 3 pounds thereof in any one hour, from any article, machine, equipment or other contrivance in which any organic solvent or any material containing organic solvent comes in contact with flame or is baked, heat-cured, or heat-polymerized, in the presence of oxygen, unless said discharge has been reduced by at least 85%.

b) It shall be prohibited to discharge into the atmosphere more than 40 pounds of organic materials in any one day, nor more than 8 pounds in any one hour, from any article, machine, equipment, or other contrivance used under conditions other than described in a) above for employing, or applying, any photochemically reactive solvent, as defined in subsection B.1.c) or material containing such photochemically reactive solvent, unless said discharge has been reduced by at least 85 percent. Emissions of organic materials into the atmosphere resulting from air or heated drying of products for the first 12 hours after their removal from any article, machine, equipment, or other contrivance described in this subsection B. shall be included in determining compliance with this subsection. Emissions resulting from baking, heat-curing, or heat-polymerizing as described in subsection B. 3.a)shall be excluded from determination of compliance with this subsection.

c) It shall be prohibited to discharge into the atmosphere more than 3,000 pounds of organic materials in any one day, nor more than 450 pounds in any one hour, from any article, machine, equipment or other contrivance in which any non-photochemically reactive organic solvent or any material containing such solvent is employed or applied, unless said discharge has been reduced by at least 85 percent. Emissions of organic materials into the atmosphere resulting from air or heated drying of products for the first 12 hours after their removal from any article, machine, equipment, or other contrivance described in this subsection c) shall be included in determining compliance with this subsection c). Emissions resulting from baking, heat-curing, or heat-polymerizing as described in subsection B.3.a) shall be excluded from determination of compliance with this subsection.

d) Emissions of organic materials into the atmosphere required to be controlled by subsection B.3.a)-c) shall be reduced by:
   - i) Incineration, provided that 90 percent or more of the carbon in the organic material being incinerated is oxidized to carbon dioxide,
   - ii) Adsorption, or
   - iii) Processing in a manner to be not less efficient than i) or ii) above, provided said processing and equipment, as documented, is submitted to and approved by the Division.

4. Exceptions. The provisions of this subsection B. shall not apply to:
   - a) The manufacture of organic solvents, or the transport or storage of organic solvents or materials containing organic solvents.
   - b) The use of equipment for which other requirements are specified by other subsections of this section VII, or which are exempt from air pollution control requirements.
   - c) The use of any material in any article, machine, equipment, or other contrivance described in B.3.a)-c) if the organic solvent or any material containing organic solvent does not come into direct contact with flame, and if the total volatile content of the material is not photochemically reactive as defined in B.1.c), and it meets any one of the following conditions:
     - i) The total volatile content contains not more than 20% by volume organic solvent, and the remainder consists only of water, or
     - ii) The total volatile content does not exceed 30% by volume, and a substantial portion of which evaporates before reaching the first heated zone, or
     - iii) The total volatile content does not exceed 5% by volume.

COLORADO: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

VIII. Emissions Standards for Hazardous Chemical Substances and Physical Agents

A. Substances on TLV Lists

1. No person shall cause or permit the emission of any chemical substance or physical agent listed in the 1973 edition of "Threshold Limit Values" (TLV) as published by the American Conference of Governmental Industrial Hygienists (ACGIH), adopted at the 35th Annual Meeting in Boston, Mass. in May, 1973 to exceed the allowable emission rate as determined herein. Only those substances and agents with numerical limit values on such TLV list and substances specially designated herein shall be subject to the limitations of this Section VIII.
   a) Exemptions to standards in this section VIII are shown in VIII. D.

2. A partial listing (only compounds beginning with letter "a") of threshold limit values for hazardous substances and agents as adopted by the ACGIH and referenced in A.1. is shown below. No analysis has been made of this list to determine relevant compounds and values for standards, as it is anticipated that analysis of health effects and projected standards for many such currently non-criteria trace elements is to be the subject of future project work.

ADOPTED VALUES (in Alphabetic Order)

	Substance	a) ppm	b) mg/M^3
	Abate	-	10
+	Acetaldehyde	100	180
	Acetic acid	10	25
+C	Acetic anhydride	5	20
	Acetone	1,000	2,400
	Acetonitrile	40	70
	2-Acetylamino-fluorene- Skin	-	A^2
	Acetylene	F	-
	Acetylene dichloride, see 1, 2-Dichloroethylene	-	-
	Acetylene tetrabromide	1	14
	Acrolein	0.1	0.25
	Acrylamide - Skin	-	0.3
	Acrylonitrile - Skin	20	45
	Aldrin - Skin	-	0.25
	Allyl alcohol - Skin	2	3

VIII. Emission Standards for Hazardous Chemical Substances and Physical Agents (Contd.)

	Allyl chloride	1	5
*C	Allyl glycidyl ether (AGE)	(10)	(45)
	Allyl propyl disulfide	2	12
	Alundum (Al O)	-	E
	4-Aminodiphenyl - Skin	-	A1b
	2-Aminoethanol, see Ethanolamine	-	-
	2-Aminopyridine	0.5	2
+	Ammonia	25	18
*	Ammonium chloride, fume	-	10
	Ammonium sulfamate (Ammate)	-	10
	n-Amyl acetate	100	525
	sec-Amyl acetate	125	650
	Aniline - Skin	5	19
	Anisidine (o, p-isomers) -Skin	-	0.5
	Antimony & compounds (as Sb)	-	0.5
	ANTU (alpha naphthyl thiourea)	-	0.3

ADOPTED VALUES (in Alphabetic Order)

Substance	ppm a)	mg/M^3 b)
Argon	F	-
Arsenic & compounds (as As)	-	0.5
Arsine	0.05	0.2
Asphalt (petroleum) fumes	-	5
Azinphos methyl - Skin	-	0.2

NOTES

Capital letters refer to appendices (not included herein)

* 1972 Addition

** See notice of intended changes

+ 1973 Addition

a) Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 mm Hg. pressure.

b) Approximate milligrams of substance per cubic meter of air.

d) An atmospheric concentration of not more than 0.02 ppm, or personal protection may be necessary to avoid headaches.

e) <5-7 um in diameter

f) As sampled by method that does not collect vapor.

g) According to analytically determined composition.

h) For control of general room air, biologic monitoring is essential for personnel control.

VIII. Emission Standards for Hazardous Chemical Substances and Physical Agents (Contd.)

3. The provisions of A.1. above shall apply to lead with substitutions as follow for the T.L.V. value of lead in the referenced T.L.V. list (for use in allowable emission calculation procedures herein).

   lead: T.L.V.
   0.04 mg/M^3 (Use as a "C" prefix limit in calculations herein with no excursion factor to be included).

4. Determination of allowable emissions for substances in A.1.-3. herein shall be carried out as shown in subsection VIII. C.

5. Any person subject to this regulation must also conform to standards of all other applicable Colorado air regulations and meet the most stringent requirements as between such other regulations and all applicable standards herein.

B. Standards for Beryllium

1. TLV Standard
   0.002 mg/M^3 (no "C" prefix)

2. Additional Standards for Beryllium Emissions from Incinerators
   a) Definition. "Incinerator" means any furnace used in the process of burning waste for the primary purpose of reducing the volume of the waste by removing combustible matter.
   b) The burning of beryllium or beryllium containing waste is prohibited except in incinerators.
   c) Maximum emission
      10g/24 hr period, except as provided for in 1.d) below
   d) Alternate standard
      It may be requested, subject to application to and approval from the Division, that an ambient concentration limit for beryllium in the vicinity of the source be used as an alternate to the emission standard in 1.b) above.
      This ambient standard is:
      0.01 ug/M^3, averaged over a 30-day period.
      (approval requires submittal of considerable recent historical process operating data)

C. Calculation Method for TLV Substances
Regulation No. 8 of the Colorado air regulations presents procedures for calculating allowable emissions in g/sec of

VIII. Emission Standards for Hazardous Chemical Substances and Physical Agents (Contd.)

substances to which this section VIII is applicable. A brief summary of these procedures follows.

1. Data Needed
   a) h (stack height) being the height in meters of point of emission into atmosphere above ground level.
   b) Effluent flowrate being the flowrate in cubic meters per second of effluent gases, corrected to actual conditions exiting from the opening.
   c) Temperature of effluent in degrees centigrade.

2. Basic Formulae. (Some substances on the TLV list have "C" prefixes, others do not. "C" prefixes, in effect, mean the adopted value is a maximum allowable concentration where excursions of concentration above this value for periods up to 15 minutes may result in certain intolerable or irreversible effects).
   a) for substances with "C" prefixes use:
      E = (TLV value) (Factor "A")
      where: E is allowable emission rate in g/sec; and TLV value is in Mg/M^3 and taken from the TLV value tables (of ACGIH); and Factor "A" is in MM m^3/sec and taken from the applicable nomograph in Colorado Regulation No. 8.

   b) for substances without "C" prefixes use:
      E = (TLV value) (Factor "A") (Excursion Factor)
      where: E, TLV and Factor "A" are all as defined in 2.a). above, and the Excursion Factor is taken from the proper table in Regulation No. 8.
      i) Excursion factors relate 7 or 8 hour exposures to maximum allowable short-term concentrations. They are not to be used if emission durations exceed 9 consecutive hours in any 24 hr period.

3. Calculation Procedure
   a) Factor "A" is determined from a nomograph by use of the Effective Stack Height (He), in meters, which in turn varies with actual stack height (h) in meters, and plume rise (h), in meters, according to:
      He = h + h
   b) h is obtained from a table in Regulation 8 and is dependent on Heat Emission Rate, Qh, in Kcal/sec.
   c) Qh is obtained from the relationship:
      Qh = 0.25 (Temp., °C) (Flowrate, m^3/sec)

      where: Qh is in Kcal/sec, and flowrate is that of the effluent gases

VIII. Emission Standards for Hazardous Chemical Substances and Physical Agents (Contd.)

d) The TLV value is then determined for the compound from the TLV list in Regulation No. 8. If there is an excursion factor (substance has no "C" prefix), it is obtained from the proper table in Regulation No. 8 (varying with TLV value).

e) The allowable emission rate (E) in g/sec is then calculated using the values so determined in the formula in either 2. a) or 2. b) above depending on whether a "C" prefix exists for the substance.

D. Exemptions to the standards of section VIII.

1. Gasoline and diesel-powered engines
2. Carbon dioxide
3. Sulfur dioxide
4. Oxides of nitrogen from combustion processes of less than 500,000 Btu/hr.

IX. Standards for New Stationary Sources

A. Fossil-Fuel Fired Steam Generators

1. Affected Facilities: Units >250 MM Btu/hr heat input.

2. Particulate Matter Standard

a) Maximum emission
0.10 lb/MM Btu heat input, max. 2-hr average

b) Maximum opacity
20%, except 40% permissable for not more than two hrs in any one hr.

Exception: Where the presence of uncombined water is the only reason for failure to meet the above opacity requirements, it shall not be a violation.

3. Sulfur Dioxide (SO_2) Standard

a) Maximum emission
i) Liquid fossil fuel: 0.80 lb/MM Btu heat input, max. 2-hr average
ii) Solid fossil fuel: 1.2 lb/MM Btu heat input, max. 2-hr average
iii) Where different fossil fuels are burned simultaneously in any combination, the standard shall be determined by the following:

Use: $$\text{std}= \frac{Y(0.80) + Z(1.2)}{X + Y + Z}$$ (std. in lb/MM Btu)

IX. Standards for New Stationary Sources(Contd.)

Where:
X is the % of total heat input from gaseous fossil fuel,
Y is the % of total heat input from liquid fossil fuel, and
Z is the % of total heat input from solid fossil fuel.

4. Nitrogen Oxides Standard
   a) Maximum emission
      (lbs, expressed as NO_2)

      i) gaseous fossil fuel: 0.20 lb/MM Btu heat input, max. 2 hr average
      ii) liquid fossil fuel: 0.30 lb/MM Btu heat input, max. 2 hr average
      iii) solid fossil fuel: 0.70 lb/MM Btu heat input, max. 2 hr average
      iv) where different fossil fuels are burned simultaneously in any combination, the standard shall be determined by the following:

$$\text{Use: std} = \frac{X(0.20) + Y(0.30) + Z(0.70)}{X + Y + Z}$$

Where:
X is the % of total heat input from gaseous fossil fuel, and
Y is the % of total heat input from liquid fossil fuel, and
Z is the % of total heat input from solid fossil fuel.

B. Incinerators

1. Affected Facilities: Incinerators of more than 50 tons per day charging rate.

2. Particulate Matter Standard
   a) Maximum emission
      0.08 gr/S.C.F., corrected to 12% CO_2, max. 2-hr average

C. Petroleum Refineries

1. Affected Facilities: fluid catalytic cracking unit catalyst regenerators, fluid catalytic cracking unit incinerator waste heat boilers, and fuel gas combustion devices within petroleum refineries.

2. Definitions
   a) "Fuel gas" means any gas which is generated by a petroleum refinery process unit and which is

combusted, including any gaseous mixture of natural gas and fuel gas which is combusted.

b) "Fuel gas combustion device" means any equipment, such as process heaters, boilers and flares used to combust fuel gas, but does not include fluid coking unit and fluid catalytic cracking unit incinerator-waste heat boilers or facilities in which gases are combusted to produce sulfur or sulfuric acid.

c) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

d) "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives.

e) "Process gas" means any gas generated by a petroleum refinery process unit, except fuel gas and process upset gas.

f) "Refinery process unit" means any segment of the petroleum refinery in which a specific processing operation is conducted.

3. Particulate Matter Standard; Opacity Standard
   a) For fluid catalytic cracking unit catalyst regenerators and fluid catalytic cracking unit incinerator-waste heat boilers:
      i) Maximum particulate emission
         1.0 lb/1000 lb of coke burn-off
      ii) Maximum opacity
         less than 30%, except for 3 minutes in any 1 hour (where uncombined water is the only reason for failure to meet this requirement, there is no violation)

4. Carbon Monoxide (CO)
   a) For fluid catalytic cracking unit catalyst regenerator:

      Maximum emission
      0.050% (by vol.) in exit gases

5. Sulfur Dioxide
   a) For fuel gas combustion devices:
      i) Maximum H_2S in fuel gas entering
         0.10 gr/D.S.C.F.

ii) Exemptions and exceptions from 5.a)i) above: Combustion of process gas in a flare or the combustion in a flare of process gas or fuel gas from relief valve leakage is exempt. An election can be made to treat the gases resulting from the combustion of a fuel gas in a manner which limits the release of SO_2 to the atmosphere if it is shown to the satisfaction of the Division that this prevents SO_2 emissions as effectively as compliance with 5.a)i).

COLORADO SOLID WASTE DISPOSAL REGULATIONS

Basis: Title 30, Article 20 - Part I Solid Waste Disposal Sites and Facilities

Agency: Colorado Department of Health

I. Certificate of Designation

A. A Certificate of Designation from the Board of County Commissioners of the county is required for any person to operate a solid waste disposal site in the unincorporated portion of any country.

B. No private dumping of solid wastes shall be made on any property within the unincorporated portion of any country, except on or at an approved site and facility, but private dumping of one's own solid wastes on one's own property is allowed as long as it does not constitute a public nuisance, and is in accordance with the rules and regulations of the department.

II. Scope of Regulations

A. The regulations shall be applicable to all solid waste disposal sites and facilities, whether designated by ordinance within the corporate limits or by the Board of County Commissioners in unincorporated areas.

III. Minimum Standards

A. Obnoxious odors shall be prevented, also rodent and insect breeding and infestation shall be prevented.

B. Such sites and facilities shall comply with the health laws and regulations, and the air pollution control requirements.

C. Radioactive materials shall not be disposed of in sites not specifically designated for that purpose.

D. A site and facility operated as a sanitary landfill shall provide means of finally disposing of solid wastes on land in a manner to minimize nuisance conditions, and shall have adequate cover and survace drainage to prevent ponding and water and wind erosion.

III. Minimum Standards (Contd.)

E. Sites and facilities shall be adequately fenced to prevent waste material and debris from escaping.

F. Solid wastes deposited at any site or facility shall not be burned, provided however, in extreme emergencies, authorization for burning under controlled conditions may be given by the Department.

IDAHO WATER QUALITY STANDARDS

Basis: Water Quality Standards and Wastewater Treatment Requirements (June, 1973).

Agency: Idaho Department of Environmental and Community Services.

I. GENERAL

A. Highest and Best Practicable Treatment and Control Required

Notwithstanding the water quality standards, where a higher standard can be achieved, the highest and best practicable treatment and/or control of wastewaters activities and flows shall be provided so as to maintain dissolved oxygen at the highest desirable levels and overall water quality as good as possible; with water temperatures, coliform bacteria, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor and other deleterious factors at the lowest desirable levels.

B. General Water Quality Standards

Note: The following general water quality standards will apply to all waters of the state, both surface and underground, in addition to the specific water quality standards. Waters of the state shall not contain:

1. Toxic chemicals of other than natural origin in concentrations found to be of public health significance or to adversely affect the use for which the waters have been classified.

2. Deleterious substances of other than natural origin.

3. Radioactive materials or radioactivity other than natural origin which:

    a) Exceed the Idaho Radiation Control Regulations.

    b) Exceed the concentrations specified in the 1962 U.S. Public Health Service Drinking Water Standards for waters used for domestic supplies.

    c) Have a demonstrable effect on aquatic life.

IDAHO WATER QUALITY STANDARDS

I. GENERAL (CONTD.)

4. Floating or submerged matter not attributable to natural causes.
5. Excess nutrients.
6. Visible concentrations of oil, sludge deposits, scum, foam or other material that may adversely affect the use indicated.
7. Objectionable turbidity not of natural origin.

II. SPECIFIC WATER QUALITY STANDARDS

Note: The following specific water quality criteria represents the most stringent provisions as specified for the water use classification and, by restricting effluent emissions so as not to cause the receiving water to exceed the standards shown below, should satisfy any of the water quality for the state for any water use designation.

Substance	Limitation
1. Total Coliform	50/100 ml Geometric Mean 20% of total samples for 30 day period 200/100 ml.
2. Fecal Coliform	10/100 ml Geometric Mean 10% of total samples for 30 day period 20/100 ml; 50/100 ml for single sample.
3. Dissolved Oxygen	6 mg/l
4. pH	6.5 to 9.0
5. Temperature	No measurable increase when water temperatures are 66°F or above; no more than 2°F increase when water temperatures are 64°F or less. (as measured immediately outside the established mixing zone).
6. Turbidity	5 Jackson Units (other than natural origin, if turbidity is greater than 5 Jackson Units, then there shall be no increase greater than 5 additional Jackson Units).

II. SPECIFIC WATER QUALITY STANDARDS (CONTD.)

Substance	Limitation
7. Total Dissolved Gas	110 % of saturation at atmospheric pressure at point of sample collections.

III. REGULATIONS GOVERNING WASTEWATER DISCHARGES

A. Any person who conducts any operation which results in the discharge of wastewater shall furnish the Department of Environmental and Community Services such information as they desire.

B. Determination of adequate treatment for wastewater shall be the equivalent of 85% removal of the BOD and suspended solids, or conform with any more stringent limitations necessary to meet the state's water quality standards. Adequate waste treatment includes disinfection of any waste which may contain organisms, that produce disease in man or animals. Failure to provide adequate treatment shall be considered a violation of these regulations.

C. Notwithstanding the water quality standards contained herein, the quality of discharges to lakes and impoundments as defined by its various physical and chemical properties shall not exceed the values obtained for the same properties of the receiving water except where an effluent is currently discharged to a flowing stream which subsequently becomes an impoundment or where an industry currently discharges an effluent which is lower in quality than the receiving water only in terms of temperature.

D. Waste disposal facilities to subsurface shall be designed and located such that sources of water pollution will not enter adjacent waters. Such disposal systems shall not be located within 300 feet of the shores of lakes and impoundments, including tributary streams used for domestic, recreational or aesthetic purposes, as determined from the known highest water level of such waters.

E. Deleterious matter shall not be stored, disposed of, or allowed to accumulate in the immediate vicinity of any portion of the waters of the state in a manner that such material will or is likely to enter the water. This material shall include, but not be limited to, oil, chemicals, trash and rubbish.

III. REGULATIONS GOVERNING WASTEWATER DISCHARGES (CONTD.)

F. Accidental spills of deleterious materials shall be contained in such a manner that the waters will not be contaminated or polluted and the Department shall be notified of any such spills.

IV. REGULATIONS GOVERNING SPECIFIC ACTIVITIES

A. Land Treatment and/or disposal of liquid waste materials.

1. Wastewater shall be restricted to the premises of the disposal site unless a permit has been obtained authorizing a discharge to a waterway.

2. Provisions shall be made for monitoring the quality of the ground water in proximity of the disposal area. The minimum frequency of monitoring and data submittal will be determined by the Department.

3. Land treatment and/or disposal shall not create a public health hazard, a nuisance condition, or an air pollution problem.

V. DEFINITIONS

A. Department - means the Idaho Department of Environmental and Community Services.

B. Effluent - any point source wastewater discharged directly or indirectly to the waters of the state or to any storm sewer and the runoff from land used for the disposition of wastewater or sludges.

C. Wastewater - Sewage, industrial waste and associated solids or combinations of these, whether treated or untreated, plus any admix runoff from the land.

IDAHO: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Idaho Department of Health and Welfare

I. General Provisions

A. Definitions

1. "Air Contaminant" means dust, fume, gas, mist, odor, smoke, vapor, pollen, soot, carbon or particulate matter or any combination thereof.

2. "Air Pollution" means the presence in the outdoor atmosphere of any contaminant or combination thereof in such quantity of such nature and duration and under such conditions as would be injurious to human health or welfare, to animal or plant life, or to property, or to interfere unreasonably with the enjoyment of life or property.

3. "Fuel-burning Equipment" means any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer.

4. "Fugitive Dust" means solid, airborne particulate matter emitted from any source other than through a stack.

5. "Incinerator" means any source consisting of a furnace and all appurtenances thereto designed for the destruction of refuse by burning. "Open Burning" is not considered incineration. For purposes of these rules the destruction of any combustible liquid or gaseous material by burning in a flare stack shall be considered incineration.

6. "Industrial Process" means any step in a manufacturing operation which results in the emission of particulate matter to the atmosphere.

7. "Particulate Matter" means any material, except water in uncombined form, that exists as a liquid or a solid at standard conditions.

8. "Process Weight" means the total weight of all materials introduced into any source operation which may cause any emissions of particulate matter. Process weight includes solid fuels charged, but does not include liquid and gaseous fuels charged nor combustion air.

IDAHO: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

I. General Provisions (Contd.)

9. "Process Weight Rate" means the rate established as follows: For continuous or long-run steady-state source operations, the total process weight for the entire period of continuous operation or for a typical portion thereof divided by the number of hours of such period or portion thereof.

   For cyclical or batch source operations, the total process weight for a period that covers a complete operation or an integral number of cycles, divided by the hours of actual process operation during such a period. Where the nature of any process or operation or the design of any equipment is such as to permit more than one interpretation of this definition, the interpretation that results in the minimum value for allowable emission shall apply.

II. Visible Emission Standards

A. Maximum Emissions

No. 1 on Ringelmann Chart (or equivalent opacity), except for three minutes in any one hour.

Exception: This provision shall not apply when the presence of uncombined water is the only reason for failure to comply.

III. Emission Standards for Fugitive Dust

A. Affected facilities: Any facility that emits or causes fugitive dust.

B. Control Standards: All reasonable precautions shall be taken to prevent particulate matter from becoming airborne. Reasonable precautions shall include but are not limited to the following:

1. Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land.

2. Application of asphalt, oil, water or suitable chemicals to, or covering of dirt roads, material stockpiles, and other surfaces which can create dusts.

3. Installation and use of hoods, fans, and fabric filters or equivalent systems to enclose and vent the handling of dusty materials. Adequate containment methods should be employed during sandblasting or other operations.

III. Emission Standards for Fugitive Dust (Contd.)

4. Covering, at all times when in motion, open bodied trucks transporting materials likely to give rise to airborne dusts.

5. Paving of roadways and maintaining them in a clean condition.

6. Prompt removal of earth or other stored material from streets.

IV. Emission Standards for Particulate Matter

A. Fuel Burning Equipment

1. Affected Facilities: All fossil fuel burning equipment rated $\geq$ one MM Btu/hr heat input.

2. Maximum Particulate Emissions

a)

Total heat input, $\leq$10 MM Btu/hr:	0.6 lbs/MM Btu heat input
Total heat input, $\geq$10 MMM Btu/hr:	0.12 lbs/ MM Btu heat input
Total heat input, >10 MM Btu/hr <10 MMM Btu/hr:	$\log Y = 0.2300 \log X - 2.0111$

where: Y lbs of particulates, and X is the total heat input in MM Btu

b) Heat input shall be calculated as the aggregate heat content of all fuels (using the upper limit of their range of heating value) whose products of combustion pass through the stack or chimney.

i) When two or more fuel burning units are connected to a single stack, the combined heat input of all units connected to the stack shall be used to determine the allowable emission from the stack.

B. Industrial Processes

1. Affected facilities: any operation, process, or activity not identified by name and specifically regulated elsewhere in these regulations.

2. Maximum Particulate Emissions

Use the following:
for process weight $\leq$60,000 lb/hr

$$E = 4.10P^{0.67}$$

IV. Emission Standards for Particulate Matter (Contd.)

for process weight >60,000 lb/hr

$$E = 55.0P^{0.11} - 40$$

where: (in both equations):
E is the emission rate in lb/hr, and
P is process weight rate in T/hr

C. Incinerators

1. Maximum Particulate Emissions (All Incinerators)
0.2 lbs/100 lbs refuse burned

2. All incinerators shall comply with the provisions and requirements of the design standards for "Multiple-Chamber Incinerators" adopted by Los Angeles County, Ca. or shall be approved by the Department as being equally effective for air pollution control.

V. Standards for Sulfur Content in Fuels

A. Definitions

1. "Distillate Fuel Oil" means any oil meeting the specifications of ASTM Grade 1 or 2 fuel oils.

2. "Residual Fuel Oil" means any oil meeting the specifications of ASTM Grade 4, 5, and 6 fuel oil

B. Residual fuel oil
Maximum Sulfur Content
1.75% (by weight)

C. Distillate Fuel Oil

Maximum Sulfur Content
ASTM Grade 1 fuel oil - 0.3% (by weight)
ASTM Grade 2 fuel oil - 0.5% (by weight)

D. Coal

Maximum Sulfur Content
1.0% (by weight)

VI Standards for Fluoride Emissions

A. It shall be prohibited to discharge into the atmosphere fluorine, fluorides, or other fluorine compounds in such quantities (in combination with all other sources of fluorine, fluorides, or fluorine compounds, both natural and man-made) that the total fluoride content in vegetation for feed and forage resulting from contact with the ambient air exceeds:

VI. Standards for Fluoride Emissions (Contd.)

a) 40 parts per million, dry basis - annual arithmetic mean.
b) 60 parts per million, dry basis - monthly concentration for two consecutive months.
c) 80 parts per million, dry basis - monthly concentration never to be exceeded.

VII. Standards for Control of Odors

A. Affected facilities: All sources of odorous emissions for which no other gaseous emission control regulations herein apply.

B. Standards

1. It shall be prohibited to cause or allow the emission of odorous gases, liquids, or solids in such quantities as to cause air pollution.

2. It shall be prohibited to cause or allow chemical processes utilizing animal, mineral, or vegetable matter to be operated without employing reasonable measures for the control of odorous emissions including wet scrubbers, incinerators, chemical or other such measures as may be approved by the Department.

VIII. Standards for New Stationary Sources

A. The relevant Federal regulations for the new stationary emission sources (40 CFR, Part 60) shown in subsection B. below are incorporated with one change as noted. The portions of those relevant Federal regulations have been synopsized herein and this synopsis may be found under the "Federal EPA Regulations and Standards" section of this report.

B. The Federal regulations incorporated herein because relevant or partially relevant to fossil-fuel conversion facilities within the scope of this project cover the following listed plants or facilities:

1. Fossil-fuel fired steam generators (40 CFR, Part 60, Subpart D).*

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*When considering an application for a Permit to Construct a fossil fuel fired steam generator, the Department shall determine on a case-by-case basis whether emissions may be reduced to a greater degree than these Federal emissions standards by the application of the best currently available control technology. The Department will set forth its reasons for the inclusion of such emission standards that are more restrictive than the Federal emission standards.

IDAHO: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

VIII. Standards for New Stationary Sources (Contd.)

2. Incinerators (40 CFR, Part 60, Subpart E).
3. Storage Vessels for Petroleum Liquids (40 CFR, Part 60, Subpart K).
4. Petroleum Refineries (40 CFR, Part 60, Subpart J).

C. Sources not specifically regulated under subsections A. and B. above shall achieve the greatest degree of emission reduction that has been adequately demonstrated.

IDAHO SOLID WASTE REGULATIONS

Basis: Idaho Solid Waste Management Regulations and Standards (June 1973)

Agency: Idaho Department of Health and Welfare

I. Conditional Use Permit

A. Solid Waste Management operations other than sanitary landfills and some activities at sanitary landfills will be required to apply for a conditional use permit.

II. Standards

A. Standards which must be complied with at all solid waste management sites shall include, but are not limited to the following:

1. All weather access roads shall be provided to the entrance of the site where a public road does not exist.
2. Provision for weighing or measuring all solid waste delivered to the site.
3. Communication shall be available at or readily accessible to the site.
4. Necessary measures shall be taken to prevent and extinguish fires, to include functional fire extinguishers for all equipment and buildings.
5. Access to the site shall be limited to those times when an attendant is on duty.
6. Unloading of solid waste shall be controlled for proper operation.
7. Salvaging or recycling operations require a conditional use permit.
8. Vector control procedures shall be established.
9. Adequate sanitary facilities shall be provided for employees.
10. A daily written log shall be maintained by the site operator.

II. Standards (Contd.)

B. Definitions

1. "Solid waste management site" - means any land area used for storage, transfer, processing, separation, incineration, composition, treatment, recycling, reuse, or disposal of solid wastes.

2. "Solid waste" - means all solid material that is considered to be useless, unwanted, or discarded by the person in possession of it. Solids in gaseous or liquid wastes that are in the process of treatment or reuse and naturally occurring rock and soil are not considered solid waste.

3. "Sanitary landfill" - means a solid waste disposal operation where the wastes are spread on land in thin layers, compacted to the smallest practical volume, and covered with cover material once each day of operation in order to safeguard against environmental pollution, nuisances, and health hazards.

4. "Conditional Use Permit" - means a written authorization issued by the Department which, by its conditions, may authorize the permittee to construct, install, or operate facilities and conduct specific activities in accordance with specified limitations.

ILLINOIS WATER QUALITY STANDARDS

Basis: Water Pollution Rules and Regulations, Chapter 3, September 1976

Agency: Illinois Environmental Protection Agency, Pollution Control Board

Note: (1) The water quality standards must be met at every point outside of the mixing zone. No single mixing zone shall exceed the area of a circle with a radius of 600 feet.

I. GENERAL WATER QUALITY STANDARDS - APPLICABLE TO ALL STATE WATERS

A. All waters of the state shall be free from the following:

1. Unnatural sludge or bottom deposits;
2. Floating debris;
3. Visible oil;
4. Odor;
5. Unnatural plant or algae growth;
6. Unnatural color or turbidity; and
7. Substances in concentrations or combinations toxic or harmful to human, animal, plant or aquatic life of other than natural origin.

B.	pH (range)	6.5 - 9.0
C.	Phosphorus (as P)	$\leq$0.05 mg/l
D.	Dissolved Oxygen	>6.0 mg/l at least 16 hours of any 24 hour period, nor less than 5.0 mg/l at any time.
E.	Radioactivity	Gross beta $\leq$100 pCi/l Radium 226 $\leq$1 pCi/l Strontium 90 $\leq$2 pCi/l

ILLINOIS WATER QUALITY STANDARDS

I. GENERAL WATER QUALITY STANDARDS - APPLICABLE TO ALL WATERS (CONTD.)

F. The following levels of chemical constituents shall not be exceeded:

Constituents	Concentration (mg/l)
Ammonia Nitrogen (as N)	1.5
Arsenic (total)	1.0
Barium (total)	5.0
Boron (total)	1.0
Cadmium (total)	0.05
Chloride	500.0
Chromium (hexavalent)	0.05
Chromium (trivalent)	1.0
Copper (total)	0.02
Cyanide	0.025
Fluoride	1.4
Iron (total)	1.0
Lead (total)	0.10
Manganese (total)	1.0
Mercury (total)	0.0005
Nickel (total)	1.0
Phenols	0.10
Selenium (total)	1.0
Silver (total)	0.005
Sulfate	500.0
Total Dissolved Solids	1000.0
Zinc	1.0

G.	Fecal Coliforms	$\leq$200/100 ml, nor shall more than 10% of the samples during any 30 day period exceed 400/100 ml.

Note: The proposed amendments to the Illinois Water Pollution Regulations have deleted this Fecal Coliform limitation as shown in G immediately above. The proposed amendments were published in the June 9, 1977 Illinois Environmental Register #148.

H.	Toxic Substances	$\leq$1/10 of 48 hour median tolerance limit (48-hr TLM) for native fish or essential fish food organisms.
I.	Temperature Rise	$\leq$5°F above natural ambient temperature.

ILLINOIS WATER QUALITY STANDARDS

II. SECONDARY CONTACT AND INDIGENOUS AQUATIC LIFE STANDARDS

A. Applicability

Waters which will be appropriated for recreational or other use in which contact is either incidental or accidental and which the probability of ingesting appreciable quantities of water is minimal.

B. Waters designated for this restricted use shall meet the following standards:

1. Freedom from unnatural sludge or bottom deposits, floating debris, visible oil, odor, unnatural plant and algae growth, or unnatural color or turbidity.

2. pH (range) — 6.0 - 9.0

3. Fecal Coliform — ≤1000 ml/100 ml based on a minimum of 5 samples taken over not more than a 30 day period, nor shall more than 10% of the samples during any 30 day period exceed 2,000/100 ml.

Note: The proposed amendments to the Illinois Water Pollution Regulations have deleted this Fecal Coliform standard.

4. Concentrations of other substances shall not exceed the applicable effluent standards as prescribed in III below.

Note: The proposed amendments to the Illinois Water Pollution Regulations have substantially changed this section which is as follows:

"Concentrations of other chamical constituents shall not exceed the following." [Proposed Rule 205(e)]

Constituent	Concentration (mg/l)
Ammonia Nitrogen (as N)	2.5 (April-October) 4.0 (November-March)
Arsenic (total)	1.0
Barium (total)	5.0
Cadmium (total)	0.15
Chromium (total Hexavalent	0.30

ILLINOIS WATER QUALITY STANDARDS

II. SECONDARY CONTACT AND INDIGENOUS AQUATIC LIFE STANDARDS (CONTD.)

Constituent	Concentration (mg/l)
Chromium (total Trivalent)	1.0
Copper (total)	1.0
Cyanide	0.025
Fluoride (total)	15.0
Iron (total)	2.0
Iron (dissolved)	0.5
Lead (total)	0.10
Manganese (total)	1.0
Mercuiry (total)	0.0005
Nickel (total)	1.0
Oil (Hexane Solubles or Equivalent)	15.0
Phenols	0.3
Selenium	1.0
Silver	0.10
Zinc (total)	1.0
Total Dissolved Solids	1000

5. Temperature — Shall not exceed 93°F more than 5% of the time, or 100°F at any time.

Note: The proposed amendments to the Illinois Water Pollution Regulations would add a new standard to this section, which would be as follows under number 6.

6. Toxic Substances

Any substance toxic to aquatic life not listed under proposed rule 205(e) (see number 4 above) shall not exceed one-half of the 96 hour medium tolerance limit (96-hour TLM) for native fish or essential fish food organisms.

III. EFFLUENT STANDARDS

Note: (1) Except as otherwise provided for, compliance with the numerical standards in this part shall be determined on the basis of 24 hour composite samples, and no contaminant shall at any time exceed five times the numerical standard prescribed in this part.

A. No effluent shall contain the following:

1. Settleable solids;
2. Floating debris;

ILLINOIS WATER QUALITY STANDARDS

III. EFFLUENT STANDARDS

3. Visible oil, grease, scum, or sludge solids, and

4. Color, odor and turbidity must be reduced below obvious levels.

B. Fecal Coliforms $\leq$400/100 ml

Note: The proposed amendments to the Illinois Water Pollution Regulations have deleted this fecal coliform effluent limitation and substitutes the following:

No effluent from any source which discharges to the following locations shall exceed 400 fecal coliforms/100 ml: (proposed rule 405)

(a) Within 20 stream miles upstream of a public beach. This limitation applies only during May through September.

(b) Within 20 stream miles upstream of a water intake for public or food processing water supply.

(c) To any location where it may cause or contribute to violation of another state's water quality standards in interstate waters.

C. Nitrogen $\leq$2.5 mg/l - April through October
$\leq$4.0 mg/l - at other times

D. Phosphorus $\leq$1.0 mg/l within Lake Michigan Basin and Fox River Basin.

E. Additional contaminants which shall not be exceeded by any effluent:

Constituent	Concentration (mg/l)
Arsenic (total	0.25
Barium (total)	2.0
Cadmium (total	0.15
Chromium (total hexavalent)	0.30
Chromium (total trivalent)	1.0
Copper (total)	1.0
Cyanide	0.025
Fluoride (total)	15.0
Iron (total)	2.0
Iron (dissolved)	0.50
Lead (total)	0.10
Manganese (total)	1.00
Mercury (total)	0.0005

ILLINOIS WATER QUALITY STANDARDS

III. EFFLUENT STANDARDS

Constituent	Concentration (mg/l)
Nickel (total)	1.0
Oil (hexane solubles or equivalent)	15.0
*pH (range)	5-10
Phenols	0.3
Selenium (total)	1.0
Silver	0.1
Zinc (total)	1.0
Total Suspended Solids (from sources other than those covered by 3 below)	15.0

*The pH limitation is not subject to averaging and must be met at all times.

2. Total Dissolved Solids — $\leq$750 mg/l above background concentration levels, unless caused by recycling or other pollution abatement practices, and in no event shall exceed 3,500 mg/l at any time.

3. All effluents containing Deoxygenating Wastes

(a) BOD5 $\leq$30 mg/l
(b) Suspended Solids $\leq$37 mg/l

F. NPDES Effluent Standards

1. No person who has been issued a NPDES permit may discharge any contaminant in his effluent in excess of this standards and limitations set forth in the permit.

2. No person may discharge any pollutant which contributes to or threatens to cause a violation of any applicable federal or state water quality standard, effluent standard, guideline or other limitation unless the limitation for such a pollutant has been set forth in an applicable NPDES permit.

IV. PERFORMANCE CRITERIA

A. Malfunctions

IV. PERFORMANCE CRITERIA (CONTD.)

All treatment works and associated facilities shall be constructed so as to minimize violations of the standards during such contingencies as flooding, adverse weather, power failure, equipment failure, or maintenance, through such measures as multiple units, holding tanks, duplicate power sources, or such other measures as may be appropriate.

B. Spills

All reasonable measures, including where appropriate, the provision of catchment areas, relief vessels, or entrapment dikes, shall be taken to prevent any spillage of contaminants from causing water pollution.

V. PERMIT REQUIREMENTS (Other than NPDES)

A. Construction Permits

Except for treatment works or wastewater sources which have or will have discharges for which NPDES permits are required, and for which NPDES permits have been issued by the agency, no person shall cause or allow the construction of any new treatment works, sewer, or wastewater source (or modification of existing facilities) without a construction permit (with some exceptions).

ILLINOIS: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Illinois Pollution Control Board

I. General Provisions

A. Definitions

1. "Opacity" means a condition which renders material partially or wholly impervious to transmittance of light and causes obstruction of an observer's view.

2. "Actual heat input" means the quantity of heat produced by the combustion of fuel using the gross heating value of the fuel.

3. "Process" means any stationary emission source other than a fuel combustion emission source or an incinerator.

4. "Volatile Organic Material" means organic material which has a vapor pressure of 2.5 pounds per square inch absolute (psia) or greater at 70°F.

5. "Unregulated Safety Relief Valve" means a safety relief valve which cannot be actuated by a means other than high pressure in the pipe or vessel which it protects.

B. General prohibition of air pollution

The discharge or emission of any contaminant into the environment in any state, either alone or in combination with other contaminants, that cause or tends to cause air pollution in Illinois, or to violate the provisions of these regulations, or so as to prevent the attainment or maintenance of any applicable ambient air quality standard is prohibited.

II. Visible Emission Standards

A. Maximum Emission Standards

1. Fuel Combustion sources with actual heat input ≤ 250 MM Btu per hr.

20 % Opacity

Exception: Opacity may be in excess of 20% up to 40% for periods aggregating not more than 3 minutes in any 60 minute period and not in excess of 20% opacity more than 3 times in any 24 hour period, provided only a single source is involved and such source is not within a 1000 foot radius from the center point of any other such emission source on the same site.

II. Visible Emissions Standards (Contd.)

2. Maximum emission for other sources

a) 30% Opacity - generally; or,

b) 60% Opacity for periods aggregating not more than 8 minutes in any 60 minute period and not in excess of 20% more than 3 times in any 24 hour period, provided only a single source is involved and such source is not within a 1000 foot radius from the center point of any other such emission source on the same site.

B. Exceptions to II.A Standards

1. Exemptions from subsection A standards shall be allowed for periods of startup, malfunctions, and breakdowns as provided for in relevant operating permits only.

2. Visible emissions due to the presence of water or water vapor shall be exempt.

3. Emission sources in compliance with particulate emissions standards of section III below during the relevant period, but not in compliance with the II.A standard above, are exempt.

C. All visual emission opacity standards herein shall be considered equivalent to Ringelmann Chart readings generally accepted to be corresponding.

III. Particulate Emission Standards

A. Standards for Fuel Combustion Sources

Maximum emission - solid fuel only used

0.1 lbs particulate per million Btu actual heat input, in any 1 hr period.

Maximum emission - liquid fuel only used

0.1 lbs particulate per million Btu actual heat input, in any 1 hr period.

Maximum emission - more than one type fuel used simultaneously

use: $E = S_s H_s + 0.10\ H_1$

III. Particulate Emission Standards (Contd.)

where: E = allowable particulate emission, lbs per hr.
S_s = applicable solid fuel particulate emission standard, lbs per million Btu actual heat input.
H_s = actual heat input from solid fuel, MM Btu per hr.
H_1 = actual heat input from liquid fuel, MM Btu per hr.

B. Standards for Incinerators - Maximum Particulate Emissions

$\leq$ 2000 lbs refuse per hour burned

0.1 grains per std cubic foot effluent gases corrected to 12% CO_2

$>$ 2000 lbs $<$60,000 lbs refuse per hour burned

0.08 grains per std cubic foot effluent gases,corrected to 12% CO_2

$\geq$ 60,000 lbs refuse per hour burned

0.05 grains per std cubic foot effluent gases, corrected to 12% CO_2

C. Standards for Fugitive Particulate Matter

1. Fugitive particulate matter shall not be emitted from any process or material handling or storage activity such that:

   a) It is visible by an observer from beyond the property line; or
   b) Particulate matter larger than 40 microns (mean diam.) in size carries beyond the property line.

2. The rules in C.1. above shall not apply to:

   a) emissions from stockpiles of materials when the wind speed average for one hour is greater than 25 mph; or
   b) emissions of water and water vapor from cooling towers.

ILLINOIS: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

III. Particulate Emission Standards (Contd.)

D. Standards for Process Sources

1. Maximum particulate emissions.

Process weight rates <450 tons per hour

use: $E = 2.54(P)^{0.534}$

where: E = allowable emissions, lbs per hr
P = process weight rate, tons per hr

Process weight rates 450 tons per hour

use: $E = 24.8(P)^{0.16}$

where: E = allowable emissions, lbs per hr
P = process weight rate, tons per hr

2. Exceptions for Catalyst Regenerators of Fluidized Catalytic Converters

a) The standards of subsection D.1. above shall not apply to catalyst regenerators of fluidized catalytic converters. The maximum emissions for these shall instead be determined as follows:

use: $E = 4.10(P)^{0.67}$ for $P \leq 30$ tons per hr
$E = [55.0(P)^{0.11}] - 40.\overline{0}$ for $P > 30$ tons per hr

where: E = allowable emissions, lbs per hr
P = catalyst recycle rate (including added fresh catalyst), tons per hr

IV Sulfur Dioxide Emission Standards

A. Standards for Fuel Combustion Sources - Maximum Emissions

1. Sources with actual heat input >250 MM Btu per hr

Solid fuel only burned:	1.2 lbs per MM Btu actual heat input in any 1 hr
Liquid Fuel:	
Residual fuel oil only burned:	0.8 lbs per MM Btu actual heat input in any 1 hr
Distillate fuel oil only burned:	0.3 lbs per MM Btu actual heat input in any 1 hr

IV Sulfur Dioxide Emission Standards (Contd.)

2. Sources with actual heat input ≤ 250 MM Btu per hr

Solid fuel only burned:	1.8 lbs per MM Btu actual heat input in any 1 hr
Liquid Fuel:	
Residual fuel oil only burned:	1.0 lbs per MM Btu actual heat input in any 1 hr
Distillate fuel oil only burned:	0.3 lbs per MM Btu actual heat input in any 1 hr

3. Sources using combinations of fuels simultaneously

a) Determine maximum emission rate using the following:

$$E = S_s H_s = 0.3\ h_d + S_R H_R$$

where: E = allowable SO_2 emission lbs per hr
S_s = solid fuel SO_2 emission standard, in lbs per million Btu, applicable,
S_R = residual fuel oil SO_2 emission, in pounds per million Btu, applicable,
H_s = actual heat input from solid fuel, million Btu per hour,
H_R = actual heat input from residual fuel oil, million Btu per hour,
H_d = actual heat input from distillate fuel oil, million Btu per hour,

and where that portion of the actual heat input that is derived:

from the burning of gaseous fuels produced by the gasification of solid fuels shall be included in H_s;

from the burning of gaseous fuels produced by the gasification of distillate fuel oil shall be included in H_d;

from the burning of gaseous fuels produced by the gasification of residual fuel oil shall be included in H_R;

from the burning of gaseous fuels produced by the gasification of any other liquid fuel shall be included in H_R; and,

from the burning of by-product gases such as those produced from a blast furnace or a catalyst regeneration unit in a petroleum refinery shall be included in H_R.

ILLINOIS: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

IV Sulfur Dioxide Emission Standards (Contd.)

B. Standards for Process Sources

1. Maximum Emission - General
   2000 ppm

2. Exceptions. B.1 above shall not apply to processes for removing sulfur compounds from flue gases of fuel combustion sources.

V. Sulfuric Acid Mist Emission Standards

A. Standards for Process Sources not including fuel combustion sources and sulfuric acid manufacturing process sources.

1. Maximum emission of sulfuric acid and/or sulfur trioxide from all process sources within a plant or facility.

for sulfuric acid usage $<$1300 tons per year
(100% acid basis)

0.10 lb in any 1 hr period

for sulfuric acid usage $\geq$1300 tons per year
(100% acid basis)

0.50 lb per ton of sulfuric acid used

VI. Organic Material Emission Standards

A. Storage Standards

Affected facilities. Stationary tanks, reservoirs, or other containers of more than 40,000 gallons capacity.

Standards. It shall be prohibited to store any volatile organic material in any affected facility unless such facility:

1. is a pressure tank capable of withstanding the vapor pressure of such materials so as to prevent vapor or gas loss to the atmosphere at all times; or,

2. is designed and equipped with one of the following vapor loss control devices:

   a) A floating roof which rests on the surface of the volatile organic material and is equipped with a closure seal or seals to close the space between the roof edge and the tank wall. Such floating roof shall not be permitted if the volatile organic material has a vapor pressure of 12.5 pounds per square inch absolute or greater at 70°F.

VI. Organic Material Emission Standards (Contd.)

b) A vapor recovery system consisting of:
   (i) a vapor gathering system capable of collecting 85% or more of the uncontrolled volatile organic material that would be otherwise emitted to the atmosphere; and
   (ii) a vapor disposal system capable of processing such volatile organic materials so as to prevent their emission to the atmosphere.

c) Other equipment or means of equal efficiency approved by the Agency.

B. Loading Standards

1. For any loading facilities with a through-put of greater than 40,000 gallon per day it shall be prohibited to:

   a) discharge more than 8 pounds per hour of organic material into the atmosphere during the loading of any organic material from the aggregate loading pipes of any such facility into any railroad tank car, tank truck or trailer unless such loading facility is equipped with submerged loading pipes or a device that is equally effective in controlling emissions and is approved by the Agency.

2. For stationary tanks of greater than 250 gallons storage capacity it shall be prohibited to:

   a) load any organic material into such stationary tanks unless such tank is equipped with a permanent submerged loading pipe or an equivalent device approved by the Agency, or unless such tank is a pressure tank as described in A.1 or is fitted with a recovery system as described in A.2(b).

3. Exception: If no odor nuisance exists the limitations of subparagraph B. of this section shall only apply to volatile organic material.

C. Organic Material - Water Separation

1. It is prohibited to use single/or multiple compartment effluent water separators receiving effluent water containing 200 gallons a day or more of organic material from equipment processing, refining, treating, storing, or handling organic material unless such separator utilizes control technology capable of reducing otherwise uncontrolled organic emissions by 85% or more.

   a) Exception. This limitation shall only apply to volatile organic material if no odor nuisance exists.

VI. Organic Material Emission Standards (Contd.)

D. Pumps and Compressors

It shall be prohibited to discharge more than two cubic inches of liquid volatile organic material (at standard conditions) into the atmosphere from any pump or compressor in any 15 minute period.

E. Use of Organic Material

1. The discharge of more than 8 lbs per hr of organic material into the atmosphere from any source is prohibited, except as provided below:

2. Alternative Standards. The limitations of E.1 shall not apply if such emissions are controlled by:
   a) flame, thermal, or catalytic incineration so as either to reduce such emissions to 10 ppm equivalent methane or less, or to convert 85% of the hydrocarbons to CO_2 and water; or
   b) a vapor recovery system which adsorbs and/or absorbs and/or condenses at least 85% of the total uncontrolled organic material that otherwise would be emitted; or
   c) other emission control technology approved by the Agency and capable of reducing the emission of otherwise uncontrolled organic material by 85% or more.

3. Exceptions. The provisions of E.1 and E.2 shall not apply:
   a) if no odor nuisance exists, unless the material is photochemically reactive.
   b) to fuel combustion sources.
   c) to the application of paving asphalt and pavement marking paint from sunrise to sunset.

F. Waste Gas Disposal

1. Petroleum refinery process emissions. It shall be prohibited to discharge organic materials in excess of 100 ppm equivalent methane (MW = 16.0) into the atmosphere from:
   a) any catalyst regenerator of a petroleum cracking system; or
   b) any petroleum fluid coker; or
   c) any other waste gas stream from any petroleum manufacturing process.

G. Vapor Blowdown. It shall be prohibited to discharge organic material into the atmosphere from any vapor blow-down system or safety relief valve, except such safety relief valves

VI. Organic Material Emission Standards (Contd.)

incapable of allowing an excessive release, unless the emission is controlled:

1. to 10 ppm equivalent methane or less; or
2. by combustion in a smokeless flare; or
3. by other control technology approved by the Agency.

H. Clean-up Operations and Organic Material Disposal. Emissions of organic material released during clean-up operations and disposal shall be included with other organic emissions from the same source or sources in determining whether emissions meet the limitations herein.

VII. Nitrogen Oxide Emission Standards

A. Standards for Fuel Combustion Sources

1. Affected facilities: Facilities with actual heat input $\geq$250 MM Btu per hr.

2. Maximum allowable emissions
(a-d. units in lbs (expressed as NO_2) per MM Btu actual heat input for any one hour period)

a) gaseous fossil fuel - 0.20
b) liquid fossil fuel - 0.30
c) dual gaseous and liquid fossil fuel - 0.30
d) solid fossil fuel - 0.70
e) for simultaneous burning of any combination of solid, liquid, and gaseous fossil fuels:

use:

$$E = \left[\frac{0.3(P_g+P_i) + 0.7(P_s)}{P_g+P_i+P_s}\right] Q$$

where: E = allowable NO_x (expressed as NO_2) emission rate in lb per hr.
P_g = % of actual heat input derived from gaseous fossil fuel.
P_i = % of actual heat input derived from liquid fossil fuel.
P_s = % of actual heat input derived from solid fossil fuel.
Q = actual heat input derived from all fossil fuels in MM Btu per hour.
$(P_g+P_i+P_s = 100.00\%)$

ILLINOIS: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

VIII. Carbon Monoxide Emission Standards

A. Standards for Fuel Combustion Sources

1. Maximum Emission

   Sources with actual heat input >10 MM Btu/hr
   200 ppm (corrected to 50% excess air)

B. Standards for Incinerators

1. Maximum Emission

   Any incinerator
   500 ppm (corrected to 50% excess air)

C. Standards for Petroleum Processes

1. The emission of carbon monoxide in a waste gas stream is prohibited unless such waste gas stream is burned in a direct flame afterburner or carbon monoxide boiler so that the resulting carbon monoxide concentration is equal to or less than 200 ppm corrected to 50% excess air, or the carbon monoxide concentration is controlled by other equivalent emission control technology approved by the Agency.

2. Notwithstanding C.1. above, any petroleum process using catalyst regenerators of fluidized catalytic converters equipped for in situ combustion of CO may emit a waste gas stream containing the following maximum CO concentration:
   350 ppm, corrected to 50% excess air

ILLINOIS SOLID WASTE RULES AND REGULATIONS

Basis: (1) State of Illinois Environmental Protection Act (July 1970 with amendments to January 1, 1974)

(2) Illinois Pollution Control Board Rules and Regulations, Chapter 7, Solid Waste.

Agency: State of Illinois Environmental Protection Agency, Pollution Control Board

Note: (1) A Development Permit is required from the Agency prior to any person developing or allowing the development of any new solid waste management site.

I. Sanitary Landfills

A. Standard requirements which must be provided at sanitary landfills:

1. Adequate shelter, sanitary facilities and emergency communications for employees;
2. Adequate roads;
3. Fencing, gates or other methods to control access to the site;
4. Adequate fire protection as approved by the Agency;
5. Adequate measures to monitor and control leachate;
6. Adequate dust control; and

B. Air and Water Pollution

A sanitary landfill shall not cause, threaten or allow the discharge of emissions of any contaminant so as to cause air or water pollution.

INDIANA WATER QUALITY STANDARDS

Basis: Water Quality Standards for all waters within the State of Indiana, SPC IR-4 (February 17, 1977).

Agency: Stream Pollution Control Board, State of Indiana

Notes: (1) The construction of any water pollution control facility, whether it be for any coal related industry or other industry, must be preceded by an application for and receipt of a construction permit.

(2) Any discharge of waste waters from coal mining activities is regulated by Indiana Water Quality Standards or Federal guidelines for the industry, whichever is more stringent.

(3) No process water discharge is permitted at all from coal preparation plants (per memo from Division of Water Pollution Control dated October 8, 1976). The current Federal regulation allow some runoff from coal preparation plants.

I. GENERAL WATER QUALITY STANDARDS (Regulation SPC IR-4)

The water quality standards established under this regulation apply to all waters of the state except where alternate standards are promulgated for specifically designated waters.

A. All waters of the state shall be free from substances:

1. That will settle to form objectionable deposits;
2. That are in amounts sufficient to be unsightly or deleterious;
3. That produce color, odor or other conditions so as to create a nuisance; and
4. From amounts sufficient to injure, be toxic or produce adverse affects.
    - a. Guideline for toxic substances:
        - 1. Limited to the 96-hour median lethal concentration significant to the aquatic community.

INDIANA WATER QUALITY STANDARDS

I. GENERAL WATER QUALITY STANDARDS (Regulation SPC IR-4) (CONTD.)

B. Minimum Water Quality for Aquatic Life

These standards are applicalbe at any point in the waters outside of the mixing zone:

1. Taste and Odor - None which is noticeably offensive and produces unpalatable flavor to food fish.

2. Toxic Substance - Shall not exceed one-tenth (1/10) of the 96-hour median lethal concentration for important and indigenous aquatic species.

3. pH - No pH values below 6.0 nor above 9.0 (except daily fluctuations which exceed 9.0 and are correlated with photosynthetic activity).

C. Water Quality for Potable Water Supply

In addition to the above water quality requirements the following standards are to protect the water quality at the point water is withdrawn for treatment and distribution as potable water supply.

1. Coliform Bacteria Group - Shall not exceed 5,000/100 ml as monthly average; nor exceed this number in more than 20% of samples during any month; nor exceed this number in more than 20% of samples during any month; nor exceed 20,000/100 ml in more thn 5% of samples.

2. Threshold Odor - Threshold odor number of finished water must be 3.0 or less.

INDIANA WATER QUALITY STANDARDS

I. GENERAL WATER QUALITY STANDARDS (Regulation SPC IR-4) (CONTD.)

3. Dissolved Solids - ≤ 250 mg/l (other than due to natural causes).

4. Radioactive Substance -

Radium - 226	≤ 3.0 pCi/l
Strontium 90	≤ 10 pCi/l
Gross beta Concentration	< 1000 pCi/l

D. Water Quality for Industrial Water Supply

In addition to the water quality standards set forth in I.A. above, the standard for protection of industrial water supply quality at the point water is withdrawn for use (either with or without treatment) is as follows:

1. Dissolved Solids - ≤ 750 mg/l as a monthly average; nor exceed 1000 mg/l at any time.

II. INDUSTRIAL WASTE WATER DISCHARGE

All industrial and any other point source wastewater discharges shall be subject to the following treatment requirements prior to discharge to the waters of the state.

A. All waste waters which contain contaminants of any kind shall be provided with the best practicable degree of waste water treatment or control consistant with technological feasibility, economic reasonableness, sound engineering judgment and environmental concern.

III. OIL, HAZARDOUS AND/OR OBJECTIONABLE SUBSTANCES (Regulation SPC16, March 7, 1974)

This regulation pertains to reporting requirements for any person who owns, operates, controls or maintains any mode of transportation, storage facility, industrial, municipal or commercial facility, in the event of a spill in such a volume to cause or threaten to cause damage to public health, animal life or plant life.

INDIANA WATER QUALITY STANDARDS

III. OIL, HAZARDOUS AND/OR OBJECTIONABLE SUBSTANCES

(Regulation SPC16, March 7, 1974)
(Contd.)

The regulation additionally requires the identification, labeling and providing information concerning the physical, biological, chemical or hazardous characteristics of substances being transported or stored in a storage facility.

Therefore as this is primarily a reporting regulation, there are no design requirements provided by this regulation.

IV. CONTROL OF CYANIDES AND CYANOGEN COMPOUNDS

(Regulation SPC2, January 1953)

This regulation is applicable to any person, firm or corporation engaged in the manufacture or other process in which cyanides or cyanogen compounds are used. The regulations require that areas where the compounds are used or stored shall be so constructed that none of the compounds can escape directly or indirectly into a sewer system or water course. However, approval may be obtained to discharge limited amounts determined not to be detrimental to public health.

INDIANA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Air Pollution Control Board

I. Visible Emission Standards

A. Maximum Emissions (all sources)

a) Shall not exceed 40% Opacity (No. 2 Ringelmann) for more than 15 minutes in a 24 hour period (visible emissions restricted do not include uncombined water)

b) Exceptions. Temporary exceptions shall include:

- i) fire starting - new boiler fires
- ii) boilers - blowing boiler tubes or cleaning boiler fires
- iii) those set forth in the approved operation permit
- iv) malfunctions of equipment where proper reporting and maintenance requirements have been complied with.

I. Particulate Matter Emission Standards

A. Process Operations

1. Affected facilities. All process sources except combustion equipment for indirect heating and incinerators (covered by separate standards herein).

2. Maximum emission rate

for process weight rates $\leq$60,000 lb/hr:

use $E = 4.10P^{0.67}$

for process weight rates > 6C,000 lb/hr but $\leq$400,000 lb/hr:

use $E = 55.0P^{0.11} - 40$

where (in both equations above):
E = rate of emission in lb/hr
P = process wt in tons/hr

for process weight rates >400,000 lb/hr:
the only limitation is that the concentration of particulates in discharge gases shall be less

II. Particulate Matter Emission Standards (Contd.)

than 0.10 lb/1000 lbs of such gases (at standard conditions).

B. Combustion of Fuel in Stationary Equipment for Indirect Heating

1. Standards for all areas of state except Indiana portion of Metropolitan Chicago Interstate Air Quality Control Region and the Metropolitan Indianapolis Intrastate Air Quality Control Region:

a) Maximum allowable concentration

$$C_{max} = \frac{76.5\ pt_f Q_m^{0.75} n^{0.25}}{a\bar{h}_s}$$

where:

C_{max} = maximum ground level concentration with respect to distance from the point source at the "critical" wind speed for level terrain. This shall not exceed 50 ug/m^3.

Pt_f = pounds of particulate matter emitted /MM Btu heat input.

Q_m = total plant operating capacity rating in MM Btu heat input per hour.

n = number of stacks in fuel burning operation.

a = plume rise factor. The value 0.67 shall be used for fuel burning equipment ratings of <1000 MM Btu heat input. No value greater than 0.8 for larger equipment ratings shall be used.

h_s = stack height in feet. The average stack height to represent "n" stacks of varying heights shall be calculated by prorating each stack height with its particulate matter emission rate.

b) Maximum emission (Pt_f) for all combustion operations with < 250 MM Btu/hr heat input
0.6 lb/MM Btu heat input

2. Standards for Indiana portion of Metropolitan Chicago Interstate Air Quality Control Region and

II. Particulate Matter Emission Standards (Contd.)

the Metropolitan Indianapolis Intrastate Air Quality Control Region:

a) Maximum allowable emission

use: $Pt_f = 0.87\ Q_m^{-0.16}$

where
Pt_f and Q_m are as defined in B.1 above; and For $Q_m < 10$: Pt_f not to exceed 0.6 lab/MM Btu heat input;
For $Q_m > 10{,}000$: Pt_f not to exceed 0.2 lb/MM Btu heat input.

3. Standards for combustion installations for indirect heating of >250 MM Btu/hr heat input throughout the State (Federal Standard of Performance for New Stationary Sources is Incorporated):

a) Maximum allowable emission (Pt_f)
0.10 lb/MM Btu heat input

C. Maximum Emissions for Incinerators

1. Definitions

a) "Primary chamber" shall mean the chamber in which waste material is ignited and burned.

b) "Secondary chamber" means the chamber in which combustible solids, vapors and/or gases from the primary chamber either are collected or are ignited and burned.

2. Standards

a) Incinerators shall consist of primary and secondary chambers or the equivalent.

b) Incinerators shall be operated so emissions of hazardous material including, but not limited to, viable pathogenic bacteria, dangerous chemicals or gases, or noxious odors are prevented.

c) Incinerators shall not create an air pollution problem, a nuisance, or a fire hazard.

II. Particulate Matter Emission Standards (Contd.)

d) Maximum emission
refuse burning capacity >200/lb hr:
0.3 lb per 1000 lb dry exhaust gas at standard conditions corrected to 50% excess air
refuse burning capacity <200 lb/hr:
0.5 lb per 1000 lb dry exhaust gas at standard conditions corrected to 50% excess air

D. Fugitive Dust Standards

1. Definitions

a) "Fugitive Dust" means the generation of particulate matter to the extent that some portion of the material escapes beyond the property line of the property on which the source is located.

b) "Respirable dust" means particles in the range of 0.5 microns to 6.0 microns in diameter.

2. Affected facilities

a) This regulation shall apply to all sources of fugitive dust.

b) The allowable particles shall refer to the total of all particles leaving the boundaries or crossing the property lines of any sources of fugitive dust regardless of whether from a single operation or a number of operations.

c) No source which is contributing to a combined downwind fugitive dust concentration in excess of the limits of regulation shall be required to reduce emissions if the concentrations at the source property line are in compliance unless all contributors are individually in compliance; each source shall then be required to reduce emissions by a like percentage to achieve an acceptable combined downwind concentration.

3. Emissions Standards

A source of fugitive dust shall be in violation of this regulation if any of the following criteria are violated:

II. Particulate Matter Emission Standards (Contd.)

a) Maximum allowable particulates. A source or combination of sources cause to exist fugitive dust concentrations greater than 67% in excess of ambient upwind concentrations as determined by the following formula:

$$P = \frac{100\,(R-U)}{U}$$

where: P = Percentage increase over ambient upwind concentration;
R = Number of particles of fugitive dust measured at downwind receptor site; and
U = Number of particles of fugitive dust measured at upwind or background site

b) Potential respiratory damage. If the fugitive dust is comprised of 50% or more respirable dust then the percent increase of dust concentration in subsection 3.a shall be modified as follows:

$$P_R = (1.5 - N)P$$

Where: N = Fraction of fugitive dust that is respirable dust;
P_R = allowable percentage increas in dust concentration above background; and
P = no value greater than 67%.

c) Ambient air concentrations. The ground level ambient air concentrations shall not be in excess of 50 ug/M^3 above background concentrations for a 60 minute period.

d) Visible emissions. If dust is visible crossing the property line of a source and may be refuted by factual data expressed in subpart D.3.a), b), or c) above.

4. Exceptions

a) Release of steam not in combination with any other gaseous or particulate pollutants unless the condensation from said steam creates a nuisance or hazard in the surrounding community.

II. Particulate Matter Emission Standards (Contd.)

b) Fugitive dust from construction or demolition where reasonable precaution has been taken in minimizing fugitive dust emissions.

c) Fugitive dust from a source caused by adverse meteorological conditions.

III. Sulfur Dioxide (SO_2) Emissions Standards

A. Standards for all Stationary Sources Emitting over 10 lbs per hour.

1. Design requirements - basic stack construction provisions.

a) Exhaust gas stacks or chimneys emitting SO_2 shall be no less than 50 ft in height. Such stacks shall be at least 2 1/2 times the height of the tallest building or obstruction within 500 feet which has a major effect on air movements.

b) The height requirement of A.1.a) above may be reduced if properly incorporated into the terms of the construction or operation permit and a showing that there will be no major effect on air movement and no violations of ground level concentrations (A.3. below) has been made.

2. Maximum emission rates

a) Large Sources: >250 MM Btu/hr heat input. The relevant Federal New Source Performance Standards, 40 CFR, Part 60, are incorporated, but ground level concenctration limits of A.3. herein also apply to these sources. The only relevant Federal standard for sulfur dioxide is Section 60.104 of Subpart J, "Standards of Performance for Petroleum Refineries." The term "petroleum" in this Federal standard is defined as the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

b) Small sources: ≤250 MM Btu/hr heat input. The lower limit as determined by application of

III. Sulfur Dioxide (SO_2) Emissions Standards (Contd.)

subsections 2. c) and 3. below shall be the controlling limitation.

c) Maximum allowable emission rate - general

i) For fuel combustion operations, including direct-fired process operations, use:
$E_m = 17.0\ Q_m^{-0.33}$;* or
$E_p = 17.0\ Q_m^{0.67}$
where: $E_p = E_m\ Q_m$;
E_m = Max. allowable SO_2 emissions in lb/MM Btu fuel heat input; an E_p = Max. allowable SO_2 emissions in lb/hr; and
Q_m = Total combustion equipment capacity rating, in MM Btu/hr fuel heat input.
(A correction to modify Q_m and therefore above equations shall be used where fuel other than Indiana coal is used).

(Definition. "Direct-fired process operations" are operations using oxygen in the air to combine with sulfur to form a marketable product.)

For all other sources not otherwise covered by this subsection A.2, use:
$E_p = 19.5P^{0.67}$
where: P = total process equipment capacity weight input in T/hr; and
E_p is as defined above.

3. Allowable ground level concentration

a) Definitions.

i) "Basin, Priority A" means any area of land (county) wherein the ambient air concentration for a specific contaminant or pollutant is equal to or in excess of the applicable primary air quality standard.

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* The value of E_m shall never exceed 6.0 lb SO_2/MM Btu heat input and need be set no lower than 1.2 lb/MM Btu heat input, regardless of the values determined by application of this formula.

III. Sulfur Dioxide (SO_2) Emissions Standards (Contd.)

ii) "Basin, Priority B" means any area of land (county) wherein the ambient air concentration for a specific contaminant or pollutant is equal to or in excess of the applicable secondary air quality standard but is less than the applicable primary air quality standard.

iii) "Basin, Priority C" means any area of land (county) wherein the ambient air concentration for a specific contaminant or pollutant is less than the applicable secondary air quality standards.

b. Maximum hourly ground level concentration (C_{max})

Priority A basins: $\leq$ 200 micrograms/m^3
Priority B basins: $\leq$ 500 micrograms/m^3
Priority C basins: $\leq$ 900 micrograms/m^3

where C_{max} is determined as follows:

i) for fuel combustion operations including direct fired process heaters

$$C_{max} = \frac{90S_f\ Q_m^{0.75} n^{0.25}}{ah_s}$$

ii) for process operations subject to A.2.c)ii) of this section III.

$$C_{max} = \frac{40S_p\ P^{0.75} n^{0.25}}{ah_s}$$

or by other approved formulae.

C_{max} = maximum hourly ground level concentration with respect to distance and at the "critical wind speed for level terrain" resulting from the point source. This shall not exceed those numbers specified for the different priority basins above. Lower values may be specified by the Board where conditions dictate.

S_f = pounds of sulfur dioxide emitted/MM BTU of fuel heat input.

III. Sulfur Dioxide (SO_2) Emissions Standards (Contd.)

S_p = pounds of sulfur dioxide emitted/T of process weight input.

E_m = maximum allowable sulfur dioxide emissions in pounds/MM BTU fuel heat input.

E_p = maximum allowable sulfur dioxide emissions in pounds/hr.

Q_m = total combustion equipment capacity rating, heat input in millions of BTU/hr.

P = total process equipment capacity weight input, tons/hr.

n = number of stacks in fuel burning or process operations.

a = plume rise factor of 0.7.

h_s stack height in feet.

The average stack height to represent "n" stacks of varying heights shall be calculated by dividing the sum of the height of each stack multiplied by its hourly sulfur dioxide emission rate by the total plant hourly sulfur dioxide emission rate.

IV. Hydrocarbon Emission Standards

A. General Provisions

1. Definitions

The term "Volatile Organic Materials" means any material containing carbon and hydrogen or containing carbon and hydrogen in combination with any other element which has a vapor pressure of 2.5 pounds per square inch absolute or greater under actual conditions.

B. Storage of volatile organic materials

1. It shall be prohibited to place, store, or hold in any stationary tank, reservoir or other container of more than 40,000 gallons capacity any volatile organic material unless such tank, reservoir, or other container is a pressure tank capable of

IV. Hydrocarbon Emission Standards (Contd.)

maintaining working pressures sufficient at all times to prevent vapor or gas loss to the atmosphere or is designed and equipped with one of the following vapor loss control devices:

a) A floating roof, consisting of a pontoon-type, double deck-type or internal floating cover, resting on the surface of the liquid contents and equipped with a closure seal or seals to close the space between the roof edge and tank wall. This control equipment shall not be permitted if the volatile organic material has a vapor pressure of 12.0 pounds per square inch absolute or greater under actual storage conditions.

b) A vapor recovery system, consisting of a vapor gathering system capable of collecting the vapors and gases discharged and a vapor disposal system capable of processing such vapors and gases so as to prevent their emission to the atmosphere.

c) Other equipment or means for purposes of vapor loss control as may be approved by the Board.

2. It shall be prohibited to store or hold in any stationary storage vessel of more than 250 gallons capacity any volatile organic compound unless such vessel is equipped with a submerged fill pipe during loading operations, or is a pressure tank, or is equipped with a vapor recovery system as described in subsection B.1.

C. Volatile Organic Materials Loading Facilities

1. Affected facilities. This rule shall not apply to the loading of volatile organic materials into tank, tank car, truck, trailer or barge from any loading facility which handles less than 40,000 gallons of volatile organic material in any one day.

2. It shall be prohibited to load any volatile organic materials into any tank, tank car, truck, trailer, or barge from any loading facility unless such loading facility is equipped with a vapor collection and disposal system, bottom loading, submerged loading, or equivalent, approved by the Board.

IV. Hydrocarbon Emission Standards (Contd.)

3. When loading of volatile organic materials into any tank, tank car, truck, trailer, or barge through a loading arm equipped with a vapor collecting adaptor, a pneumatic, hydraulic or other mechanical means shall be provided to force a vapor-tight seal between the adaptor and the hatch. A means shall be provided to prevent liquid organic material drainage from the loading device when it is removed from the hatch of any tank, tank car, truck, trailer, or barge or to accomplish complete drainage before such removal.

4. When loading of volatile organic materials is effected through means other than hatches, all loading and vapor lines shall be equipped with fittings which make vapor-tight connections and which close automatically when disconnected.

D. Volatile Organic Liquid - Water Separators

1. It shall be prohibited to use any compartment of any single or multiple compartment volatile organic liquid - water separator which compartment normally receives effluent water containing 200 gallons/day or more of any volatile organic liquid unless such compartment is equipped with one of the following vapor loss control devices.

   (a) A solid cover.

   (b) A floating roof or cover resting on the surface of the liquid contents.

   (c) A vapor recovery system of suitable design.

   (d) Other equipment or means to control evaporation losses as may be approved by the Board.

E. Waste Gas Emission Standards

1. Petroleum Refinery Emissions. No person shall cause or allow the discharge of hydrocarbons from any catalyst regeneration of a petroleum cracking system or from any petroleum fluid coker into the atmosphere unless the waste gas stream is burned in a direct-flame afterburner for boiler or is controlled by other means approved by the Board.

IV. Hydrocarbon Emission Standards (Contd.)

2. Vapor Blowdown. It shall be prohibited to emit hydrocarbon gases to the atmosphere from any vapor blowdown stream, except pressure relief valves which are required for safety reasons, unless these gases are burned in flares of smokeless design or are controlled by other means as may be approved by the Board.

F. Volatile Waste Organic Liquids

1. It shall be prohibited to dispose of any liquid or semi-liquid volatile waste organic material or sludge within the State of Indiana by any means other than as follows:

   a) Refining by acceptable means to produce a reusable product.

   b) Consuming in usable heat generation equipment.

   c) Incineration by acceptable means.

   d) Other approved means for disposal but in no case discarding in a landfill, refuse dump, or the equivalent.

G. Emission Standards for Organic Solvents

1. Definitions for purposes of subsection G.

   a) "Organic materials" means chemical compounds of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate.
   b) "Organic solvents" means organic materials which are liquids at standard conditions, and include diluents which are used as dissolvers, viscosity reducers, and cleaning agents.

2. It shall be prohibited to emit or allow the emission of more than 3 pounds of organic materials in any one hour or 15 pounds of organic materials in any one day (24 hours) unless all organic materials emitted are reduced by at least 85 percent from emissions before the application of any control equipment or process.

IV. Hydrocarbon Emission Standards (Contd.)

3. The provisions of this section shall not apply to the use of the following solvents:

   a) hydrocarbons, alcohols, aldehydes, esters, ethers or ketones provided that the total of such solvents with olefinic or cyclo-olefinic unsaturation does not exceed 5% by volume either singly or in combinations.

   b) aromatic organic solvents provided that the total of such solvents with 8 or more carbon atoms to the molecule, excluding ethyl benzene, does not exceed 8 % by volume either singly or in combinations.

   c) ethyl benzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene not exceeding 20% by volume either singly or in combinations.

   d) any organic solvent or mixture of solvents which because of its structure or composition may be subject to the limitations of more than one of the categories (i), (ii) or (iii) above, shall be considered a member of the class with the lowest percentage limitation. In no case shall a combination of compounds subject to the limitations of (i), (ii) or (iii) above exceed 20% by volume of the combination.

   e) saturated halogenated hydrocarbons, perchloroethylene, benzene, acetone, C_1-C_5 n-paraffins, cyclohexanone, ethyl acetate, diethylamine, isobutyl acetate, isopropyl alcohol, methyl benzoate, 2-nitropropane, phenyl acetate, and triethylamine.

   f) other organic solvents that have been determined by the Air Pollution Control Board to be photochemically unreactive in the formation of oxidants.

4. A greater degree of control may be required to prevent a health hazard or a local nuisance because of the particular properties of a specific organic compound. Determination of a health hazard will be based upon such factors as threshold limit values,

IV. Hydrocarbon Emission Standards (Contd.)

presence of carcinogens, and other accepted health indicators.

5. Acceptable control methods to provide compliance shall be:

   a) Consuming such gases or vapors in acceptable fuel burning equipment.

   b) Absorption or adsorption by acceptable means.

   c) Incineration by direct flame or catalytic combustion, preferably with heat recovery.

   d) Oxidation by chemical means utilizing oxidizing agents or ozone, if practical.

   e) Other means acceptable to the Board.

V. Nitrogen Oxides Emission Standards

A. Standards for Fuel Burning Equipment

1. Affected facilities: Facilities with capacities of 250 MM Btu per hr or more.

2. Maximum Emissions

   (NO_x expressed as lbs of NO_2 per MM Btu of heat input.)

   a) gaseous fossil fuel - 0.20 lbs of NO_2

   b) liquid fossil fuel - 0.30 lbs of NO_2

   c) solid fossil fuel - 0.70 lbs of NO_2

VI. Carbon Monoxide (CO) Emission Standards

A. Incinerators, Fuel Burning Equipment, and Catalyst Regeneration Units for Petroleum Refinery Cracking Processes.

1. The discharge of CO in an effluent stream to the atmosphere shall be prohibited unless the waste gas stream is burned in a direct-flame afterburner or boiler or is controlled by other approved means.

INDIANA SOLID WASTE DISPOSAL ACT

Basis: (1) Refuse Disposal Act, 1971, and as amended in 1972.

(2) Regulation SPC-18, Solid Waste Management Permit (August 1974)

Agency: Indiana Stream Pollution Control Board

Note: No person shall construct or cause to be constructed sanitary landfill facilities, or an incinerator with design capacity of greater than 30 tons per day, without a construction permit issued by the Board.

I. Sanitary Landfill

A. General Standards

1. Appropriate all weather roads must be provided.
2. Any shelter or sanitary facilities provided shall be constructed in accordance with the State Board of Health requirements for such construction.
3. No refuse deposit shall be made nearer than 600 feet to any dwelling without written consent of the occupant and/or owner.

B. Water Quality

Sanitary landfill design and operations shall conform to the following minimum water quality standards:

1. Where ground water monitoring wells are required by the Board, tests performed shall include COD, pH, Fe, Cl, conductivity and other Board specified tests.
2. Surface water courses and runoff shall be diverted from the sanitary landfill by trenches and proper grading.
3. In no case shall solid waste be deposited within an aquifer.

C. Air Quality

1. Open burning of solid waste is prohibited.

I. Sanitary Landfill (Contd.)

D. Gases

1. Decomposition gases shall be controlled on-site and shall not be allowed to migrate laterally, nor allowed to concentrate in a manner that will be an explosion or toxicity hazard.

E. Hazardous and Special Wastes

1. Hazardous wastes shall not be accepted at a sanitary landfill unless authorized in writing by the Board.

KANSAS WATER QUALITY STANDARDS

Basis: Water Quality Criteria for Interstate and Intrastate Waters of Kansas, 28-16-28, (Draft version of these criteria).

Agency: Kansas State Board of Health
Kansas Department of Health and Environment (Draft)

Notes:

1. Effluent limitations for a point discharge industry in the State of Kansas are set with regard to two regulations:

   a. The first basis for determining effluent limitations are with respect to the effluent limitations developed by the Environmental Protection Agency under the Federal Water Pollution Control Act Amendments (PL92-500).

   b. The second consideration in developing industrial effluent limitations is the water quality criteria for interstate and intrastate waters, Kansas Department of Health and Environment Regulations 28-16-28.

   The more stringent of the two requirements listed above would apply.

2. A draft version of the water pollution control regulations is currently (April 28, 1977) being prepared by the Department and where the draft provisions change, add to or modify any existing provision this will be identified and cited as DRAFT.

I. TREATMENT REQUIREMENTS

A. Best practicable control technology currently available shall be applied to all industrial wastes by July 1, 1977.

B. Best practicable control technology currently available shall be applied to all industrial wastes by July 1, 1977 unless a specific deadline extension is granted by the Department. (DRAFT)

II. GENERAL CRITERIA

A. The cumulative effect of waste discharges to waters of the state will be guided by the 1962 U.S. Public Health Service Drinking Water Standards, and polluting substances by point source waste discharges shall be maintained below maximum permissible concentrations which would be detrimental for the established water use.

KANSAS WATER QUALITY STANDARDS

II. GENERAL CRITERIA (CONTD.)

B. The cumulative effect of waste discharges to waters of the state will be guided by both the primary and secondary drinking water regulations promulgated by the EPA under authority of the Safe Drinking Water Act (P.L. 93-523). Polluting substances, where receiving waters serve established beneficial uses, shall be maintained below maximum permissible concentrations which would be detrimental for the established water use. (DRAFT)

III. SPECIFIC CRITERIA

	Class A Waters	Class B Waters
1. Fecal Coliform	≤200/100 ml-Geometric mean or not less than 5 samples taken over not more than 30 day period; nor shall more than 10% of the samples during any 30 day period exceed 400/100 ml.	≤2000/100 ml
2. Dissolved Oxygen	>5 mg/l	>5 mg/l (except for 4 mg/l for short periods of time within a 24 hour period).
3. Temperature	No heat of artificial origin shall be added to a stream in excess of the amount that will raise the temperature of the water more than 5°F above natural conditions. Receiving waters shall not exceed 90°F as a result of man made sources.	Same as for Class A Waters.
4. pH (range)	6.5 - 8.5	6.5 - 8.5
5. pH (DRAFT)	6.5 - 9.0	6.5 - 9.0
6. Ammonia	0.15 mg/l (as N)	0.15 mg/l (as N)

KANSAS WATER QUALITY STANDARDS

III. SPECIFIC CRITERIA (CONTD.)

	Class A Waters	Class B Waters
7. Oil and Grease	Essentially free of visible oil and grease.	Same as for Class A Waters
8. Solids	All waters shall be free of floating debris, scum, and other floating materials in amounts to be detrimental to established beneficial use.	Same as for Class A Waters
9. Turbidity	No increase that will cause substantial visible contrast with the natural appearance of the water.	Same as for Class A Waters
10. Taste and Odor	Substances shall be limited to concentrations in the receiving water that will not interfere with the established beneficial use of the receiving water.	Same as for Class A Waters
11. Color	Color producing substances shall be limited to concentrations which will not be detrimental to the established beneficial use of the receiving water.	Same as for Class A Waters
12. Toxic Substances	Shall be limited to concentrations in the receiving water that will not be harmful to human, animal, plant or otherwise interfere with established beneficial use of the water.	Same as for Class A Waters

KANSAS WATER QUALITY STANDARDS

IV. WATER USE CLASSIFICATION

As used above in No. III, the receiving water classifications are as follows:

A. Class A waters are to be protected for the following uses:

1. Body contact recreation, with possibility of ingestion;
2. Preservation and propagation of water life and wildlife;
3. Public water supply;
4. Industrial water supply; and
5. Agricultural purposes.

B. Class B waters are to be protected for the following uses:

1. Secondary contact recreation, ingestion not probable;
2. Preservation and propagation of water life and wildlife;
3. Public water supply;
4. Industrial water supply; and
5. Agricultural purposes.

C. Designation of water uses

A. Class A Waters

1. All lakes and reservoirs are subject to the application of Class A water quality criteria.

B. Class B Waters

2. Generally all other waters in the state, including streams and rivers, are subject to the application of Class B water quality criteria.

KANSAS: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Department of Health and Environment

I. General Provisions

A. Definitions

1. "Contaminant" means dust, fumes, smoke or other particulate, vapor, gas odorous substance or any combination thereof, but not including uncombined water vapor or steam condensate.

2. "Incinerator" means any device or structure used for the destruction or volume reduction of garbage, rubbish, or other liquid or solid waste materials by combustion pursuant to disposal or salvaging operations.

3. "Indirect Heating Equipment" means any device where fuel is burned to produce usable heat by transfer through a heat conducting materials barrier or by a heat storage medium to a material to be heated so that the material being heated is not contacted by, and adds no substance to, the products of combustion.

4. "Opacity" means the degree to which an official observer's view of transmitted light is obscured by passing through as contaminant emission with zero percent opacity being equivalent to perfect transparency and 100 percent opacity being perfectly opaque.

5. "Particulate" means any dispersed matter, solid or liquid, except uncombined water.

B. Standards

1. Interference with Enjoyment of Life and Property.

   Compliance with the regulations herein notwithstanding, should it be found after public hearing that any specific emission source is, will be, or tends to be significantly injurious to human health or welfare, animal or plant life, or property, or is or will be unreasonably interferring with the enjoyment of life and property of any inhabitant of the state, or will interfere with the attainment or maintenance of any national ambient air standards, alternate standards or orders may be issued to require additional abatement or control of certain emissions as deemed necessary to effect the purposes of the Kansas enabling act.

KANSAS: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

II. Visible Emission Standards

A. Maximum emissions - general
20% opacity

B. Fuel Burning Equipment (Indirect Heating Equipment)

1. Maximum emissions
less than 20% opacity

C. Incinerators

1. Maximum emissions
less than 20% opacity

D. Exceptions

1. It shall not be a violation of subsections A, B, or C above if it can be shown that the failure to comply with any of these standards is solely the result of the presence of uncombined water.

III. Emission Standards for Fugitive Dust

A. Standards - General

It shall be prohibited to cause or allow the handling, transport, or storage of any materials or any other use of a premise in such a manner as to allow particulate matter to become airborne to the extent that the ground level concentration at the property line equals or exceeds the following:

2.0 milligrams/cubic meter, above background concentrations, for periods aggregating more than 10 minutes in any hour.

IV. Emission Standards for Particulate Matter

A. Processing Operation Standards

1. Affected facilities: any processing machine, equipment, device, or combination thereof, excluding indirect heating equipment and incinerators.

2. Definitions

a) "Process Weight" means the total weight of all materials introduced into a source operation which

IV. Emission Standards for Particulate Matter (Contd.)

may constitute, or form, a source of particulate emissions. In the case of direct heating operations solid fuels used shall be included as part of the process weight, but liquid and gaseous fuels and combustion air shall not be included.

b) Process Weight Rate" means the total process weight introduced into the source operation over a specific time period divided by that time period, in hours. For a cyclical or batch operation, the time period shall be that required to complete one operation or a chosen integral number of cycles, and for continuous operations it shall be the total operating period or a typical portion thereof.

c) "Source Operation" means the last operation preceding the emission of particulate matter, which results in the separation of the particulate emissions from the processed materials or the conversion of the processed materials into the particulate emissions, excluding those operations which are an integral part of the functioning of a control device.

3. Standards

a) To determine the maximum emission rate, use the following:

for process weight <30 T/hr

$$E = 4.1\, P^{0.67}$$

for process weights > 30T/hr

$$E = 55P^{0.11} - 40$$

where (in both cases): E is rate of emissions in lb/hr; and
P is process weight in T/hr

b) Certain particulate emissions may, because of their chemical and/or physical nature, require emissions rates lower than those provided for in subsection A.3a). In such cases the Department shall notify the person responsible for the emission, in writing, of the reasons for special concern regarding the existing or proposed contaminant emission and specify an alternate emission rate which is not to be exceeded.

IV. Emission Standards for Particulate Matter (Contd.)

B. Fuel Burning Equipment (Indirect Heating Equipment)

1. Applicability

This subsection applies to installations in which fuel is burned for the primary purpose of producing steam, hot water, or hot air or other indirect heating of liquids, gases, or solids and in the course of so doing the products of combustion do not come into direct contact with process materials. When any products or by-products of a manufacturing process are burned for the same purpose or in conjunction with any fuel, the same maximum emission limitations shall apply.

2. Definitions

a) The "heat input" value used shall be the equipment manufacturer's or designer's guaranteed maximum input, whichever is greater.

3. Particulate Emission Standards

a) To determine the maximum permissable emission rates use the following:

$\leq$10MM Btu/hr heat input: 0.60 lb/MM Btu heat input

>10MM Btu/hr <10,000 MM Btu/hr heat input:

$$A = \frac{1.026}{I^{.233}}$$

where: A = maximum emission rate in lb/MM Btu heat input; and
I = total heat input in MM Btu/hr

$\geq$10,000 MM Btu/hr heat input: 0.12 lb/MM Btu heat input

C. Incinerators

1. Definitions

a) The "burning capacity" of an incinerator means the manufacturer's or designer's guaranteed maximum rate, whichever is greater, or such other rate as may be determined by the Department in accordance with good engineering practice.

IV. Emission Standards for Particulate Matter (Contd.)

2. Standards

a) Maximum emissions
(exhaust gas corrected to 12% CO_2)

burning capacity <200 lb/hr: 0.3 gr/DSCF of exhaust gas
burning capacity $\geq$200 lb/hr $\leq$20,000 lb/hr: 0.2 gr/ DSCF of exhaust gas
burning capacity >20,000 lb/hr: 0.1 gr/DSCF of exhaust gas

b) All incinerators shall be multiple chamber incinerators, provided that the Department shall approve any other kind of incinerator if it can be shown that such other kind of incinerator is equally effective for purposes of air pollution control. For the purpose of this regulation a multiple chamber incinerator is defined as an incinerator consisting of three or more refractory lined combustion furnaces in series, physically separated by refractory walls, interconnected by gas passage ports or ducts and employing adequate design parameters necessary for maximum combustion of the material to be burned.

V. Hydrocarbon Emission Standards

A. Storage Facilities

1. Affected facilities: Hydrocarbon tanks or containers over 40,000 gallons in capacity.

2. Standards: It shall be prohibited to place or hold any gasoline or other petroleum distillate having a vapor pressure of 3.0 psia or greater under actual storage conditions unless the container is a pressure vessel or tank capable of maintaining sufficient working pressures to prevent vapor or gas loss or is equipped with one of the following vapor loss devices:

a) A floating roof such as a pontoon type, double deck roof type, or internal floating cover which will rest on the surface of the liquid contents and be equipped with a closure seal or seals to close the space between the roof or cover edge and tank wall. This control equipment shall not be permitted if the petroleum distillate has a vapor pressure of 13.0 PSIA or greater under actual

V. Hydrocarbon Emission Standards (Contd.)

storage conditions. All tank gauging or sampling devices shall be gas-tight except when tank gauging or sampling is taking place.

- b) A vapor recovery system, consisting of a vapor gathering system capable of collecting the volatile organic compound vapors and gases discharged and a vapor disposal system capable of processing such volatile organic vapors and gases so as to prevent their emission to the atmosphere.All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.
- c) Other equipment or means of equal efficiency for purposes of air pollution control as may be approved by the Department.

C. Blowdown Systems

It shall be prohibited to emit to the atmosphere any hydrocarbon gas steam, excluding methane, of more than 50 pounds per day from a vapor blow down system unless such gases are burned by smokeless flares or an equally effective control device as approved by the Director.

VI. Emission Standards for Sulfur Compounds

A. Standards for Hydrogen Sulfide (H_2S) in Process Gas Streams

1. Maximum H_2S emission rate (or rate to any combustion device)

10 gr/100 ft^3 of gas emitted (or fed to combustion device)

2. Exceptions: The standard of A.1. shall not apply to:

- a) The combustion of fuels for indirect heating purposes
- b) The combustion of fuels where the gaseous products of combustion are used as raw materials for other processes
- c) The incineration of gases having a gross heating value of less than 300 BTU per cubic feet at standard conditions where the fuel used to incinerate such waste gases does not contain sulfur or sulfur compounds in excess of the amount specified by this section.

B. Standards for Sulfur Emissions from Fuel Burning Equipment (Indirect Heating Equipment)

KANSAS: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

VII. Emission Standards for Sulfur Compounds

1. Affected facilities: fuel burning equipment having a heat input of 250 MM Btu/hr or greater.

2. Maximum emissions of sulfur (S)
   1.5 lb/MM Btu of heat input

VII Standards for Nitrogen Oxides (NO_x)

A. Fuel Burning Equipment (Indirect Heating Equipment)

1. Affected facilities: indirect heating equipment having a heat input of 250 MM Btu/hr or greater.

2. Maximum emissions (NO_x expressed as NO_2)
   gas or oil fired: 0.30 lb/MM Btu of heat input
   coal fired: 0.90 lb/MM Btu of heat input.

VIII. Emission Standards for Carbon Monoxide (CO)

A. Petroleum Refining Processes

1. Standards

   It shall be prohibited to emit CO in a waste gas stream from any catalyst regeneration unit (for cracking systems), fluid coker, or other petroleum process unless such gas stream is burned at 1300°F for 0.3 seconds or greater in a direct-flame afterburner or equivalent approved device.

KANSAS SOLID WASTE MANAGEMENT STANDARDS

Basis: Article 29 - Solid Waste Management Standards and Regulations (November 1975). Amendments to the Solid Waste Act (HB2559, April 1977)

Agency: Department of Health and Environment, Division of Environment, Bureau of Environmental Sanitation.

I. Scope

A. These rules and regulations establish minimum standards for the storage, collection, transportation, processing, utilization and final disposal of solid wastes by any person, industry, city or county.

B. Cities or counties have the right to enact ordinances or resolutions for control of solid waste management practices which are more stringent than these regulations.

II. Standards

A. Storage of Solid Wastes

1. Owner and/or occupant of any industrial plant shall provide sanitary storage for all solid waste produced on his property which meet standards set forth in these regulations.

2. All solid waste shall be stored so that:

   a. it does not attract rats, flies or other vectors;

   b. it does not provide shelter or breeding place for vectors;

   c. it does not create a health or safety hazard;

   d. it is not unsightly; and

   e. the production of offensive odors is minimized.

B. Specific Storage Standards

1. Hazardous wastes shall be stored in:

II. Standards (Contd.)

a. A manner which will prevent spillage, leakage of liquids; and/or the concentration or generation of harmful or explosive vapors or offensive odors.

b. Containers constructed of durable, corrosion-resistant, water tight construction; provided with tight-fitting lids or covers; properly labeled, and kept in a safe location protected from tampering by unauthorized persons.

c. Other types of storage containers that have written approval of the department for use at a specific location for a specified purpose.

C. All piping, valves and other appurtenaces associated with the storage and transfer of hazardous wastes shall be constructed of corrosion-resistant materials can be maintained in a leak-proof condition.

III. Standards for Solid Waste Processing Facilities and Disposal Areas

The standards for solid waste disposal areas for the State of Kansas are essentially the same operational type standards which exist for a majority of all states. These standards include, but are not limited to, location of the disposal area, access road criteria, reporting requirements, communication standards and fire protection requirements.

IV. Amendments to the Present Solid Waste Act

A. Amendments to the present Solid Waste Act became effective April 19, 1977, and the regulations will be revised in accordance with the new amendments within the next year.

B. The amendments to the present Solid Waste Act include provisions for the adoption of rules and regulations establishing criteria for all areas of hazardous waste management including, but not limited to, the following:

1. Identification of hazardous waste including toxicity, persistence and degradability in nature,

IV. Amendments to the Present Solid Waste Act (Contd.)

potential for accumulation in tissue, flammability, corrosiveness and generation of pressure through decomposition;

2. The location of processing facilities and disposal areas for hazardous waste;
3. For the monitoring of hazardous waste processing facilities and disposal areas;
4. Adoption of rules and regulations dealing with all areas of transporting hazardous wastes; and
5. Establishment of a permit system for the construction, alteration, or operation of a hazardous waste storage or disposal area or treatment facility.

KENTUCKY WATER QUALITY STANDARDS

Basis: Kentucky Water Quality Standards, 401 KAR 5:025 and 401 KAR 5:035, July 1975

Agency: Department for Natural Resources and Environmental Protection, Bureau of Environmental Quality, Division of Water Quality

I. GENERAL CRITERIA APPLICABLE TO ALL WATERS OF THE STATE

A. All waters of the State shall be:

1. Substantially free from substances attributable to industrial or other discharges that will settle to form putrescent sludge deposits.
2. Free from floating debris, oil, scum or other floating materials.
3. Free from materials producing color, odor or other conditions which would create a nuisance.
4. Free from substances attributable to industrial or other discharges in concentrations or combinations which are toxic or harmful to human, animal, plant or aquatic life.

II. INDUSTRIAL WATER SUPPLY

A. The following criteria are applicable to water at the point which water is withdrawn for use for industrial cooling and processing and shall be applicable only within a mixing zone.

1.	pH	5 - 9
2.	Temperature	≤95°F
3.	Dissolved Solids	≤750 mg/l (monthly average) 1000 mg/l (at any time)

III. PUBLIC WATER SUPPLY AND FOOD PROCESSING

A. The following criteria are applicable to surface waters at the point which water is withdrawn for use as a public water supply or by a food processing industry.

KENTUCKY WATER QUALITY STANDARDS

III. PUBLIC WATER SUPPLY AND FOOD PROCESSING (CONTD.)

Substance or Condition	Limitations
1. Coliform Group	≤5000/100 ml as a monthly arithmetical average nor exceed this in more than twenty percent of the samples examined during any month; nor exceed 20,000/100 ml in more than five percent of such samples.
2. Threshold Odor Number	≤3 (after normal water treatment).
3. Dissolved Solids	≤500 mg/l as monthly average, nor exceed 750 mg/l at any time.
4. Radioactive Substances	Gross beta activity - 1000 picocuries per liter (pCi/l) Dissolved strontium 90 - 10 pCi/l Dissolved Alpha emmiters - 3 pCi/l

5. Chemical Constituents shall not exceed the following specified concentrations at any time:

Constituents	Concentrations in mg/l
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium (hexavalent)	0.05
Cyanide	0.025
Fluoride	1.0
Lead	0.05
Selenium	0.01
Silver	0.05

KENTUCKY WATER QUALITY STANDARDS

IV. OTHER WATER USE DESIGNATIONS

Following are the additional water use designations established by the State Water Quality Criteria.

A. Aquatic Life

Applicable to the evaluation of conditions for the maintanance of well balanced, indigenous fish population.

B. Put-and-Take Trout Streams

Applicable to those waters designated as put- and-take streams.

C. Recreation

Applicable to waters used for recreational purposes, including but not limited to such water-contact activities as swimming and water skiing.

D. Agricultural

E. Multiple Uses

One or more uses established may apply to the same waters. In the event there is a conflict between or among the applicable uses, the more stringent use criteria shall apply.

V. WATER USE CLASSIFICATION TREATMENT REQUIREMENTS (401 KAR 5:035)

A. This regulation applies to the water use classifications as shown above.

1. All persons discharging through point sources from which pollutants are or may be discharged shall apply the best practicable control technology as the department considers appropriate to treatment facilities not later than July 1, 1977.

2. All persons who discharge through a point source shall apply the best available technology economically achievable by July 1, 1983.

KENTUCKY: STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Agency: Department for Natural Resources and Environmental Protection

I. Emissions from Process Operations

A. Definitions

1. "Process operation" means any method, form, action, operation, or treatment of manufacturing or processing, and shall include any storage or handling of materials or products, before, during, or after manufacturing or processing.

2. "Process Weight" means the total weight of all materials introduced into any affected facility which may cause any emission of particulate matter, but does not include liquid and gaseous fuels charged, combustion air, or uncombined water.

3. "Particulate Matter" means any material, except uncombined water, which exists in a finely divided form as a liquid or a solid at normal operating conditions.

B. Standard for Visible Emissions

Emissions of smoke of a shade equal to or greater than twenty percent opacity shall be prohibited.

C. Particulate Emission Rate Standards

To determine the maximum emission rate of particulate matter use the following:

1. $\leq$ 60,000 lb/hr process weight rate

use: $E = 3.59 P^{0.62}$,

where: E = maximum emission rate in lb/hr
P = process weight rate in tons/hr

2. $>$ 60,000 lb/hr process weight rate

use: $E = 17.31 P^{0.16}$

where: E and P have the same meanings shown in C.1. above

KENTUCKY: STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

II. Emissions from Fuel Burning Equipment (Indirect Heat Exchangers)

A. Affected facilities.

1. Indirect Heat Exchangers with a capacity of more than one MM Btu/hr input except for those using natural gas, liquid petroleum gas, or distillate fuel oil as a main fuel or combination of these as a main or standby fuel with capacity of less than 50 MM Btu/hr input, for which these standards shall not apply. The combined total heat input capacity of all affected facilities shall be used to determine the total allowable emissions from a source.

B. Definitions

1. "Indirect Heat Exchanger" means any piece of equipment, apparatus or contrivance used for the combustion of fuel in which the energy produced is transferred to its point of usage through a medium that does not come in contact with or add to the products of combustion.

2. "Fuel" means natural gas, petroleum, coal, wood, and any form of solid, liquid, or gaseous fuel derived from such materials for the purpose of creating useful heat.

3. "Particulate Matter" means any finely divided liquid or solid material, other than uncombined water, as measured by a method specified by the Department.

C. Particulate Matter.

To determine the maximum emission rate of particulate matter use the following:

$$Y = 0.9634\ X^{-0.2356}$$

where: Y = maximum particulate emission in pounds per MM Btu heat input, and
X = heat input capacity rating in MM Btu/hr

D. Visible Emissions (Smoke).

Gases emitted to the open atmosphere from affected facilities shall not exhibit an opacity of greater than twenty percent except that a maximum of forty percent opacity shall be permissible for not more than two minutes in any hour. Where the presence of uncombined water is the only reason for failure to meet the requirements of this paragraph, such failure will not be a violation of this section.

KENTUCKY: STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

II. Emissions from Fuel Burning Equipment (Indirect Heat Exchangers) (Contd.)

E. Sulfur Dioxide (SO_2)

1. Emission to the open atmosphere of gases containing SO_2 shall be limited according to the following: use:

a) for liquid fuel $Y = 7.7223 X^{-0.4106}$
for solid fuel $Y = 13.8781 X^{-0.4434}$

where (for both fuels): Y = maximum SO_2 emissions in lbs per MM Btu/hr heat input; and X = heat input capacity rating in MM Btu/hr

b) for different fuels burned simultaneously in any combination:

$$Y = \frac{y(a) + z(b)}{y + z}$$

where: y = % of total heat input derived from liquid fuel
z = % of total heat input from solid fuel,
a = maximum SO_2 emission in lbs/MM Btu heat input derived from liquid fuel, and
b = maximum SO_2 emission in lbs/MM Btu heat input derived from solid fuel.

2. Compliance in any of the cases shown in E.1. above shall be based on the total heat input from all fuels burned, including gaseous.

F. Nitrogen Oxides

1. Maximum emissions of nitrogen oxides (expressed as NO_2) in effluent gases from fuel burning equipment with input heat capacity of 250 MM Btu per hour or more shall be as follows:

a) 0.20 lb per million Btu heat input derived from gaseous fuel.
b) 0.30 lb per million Btu heat input derived from liquid fuel.
c) 0.70 lb per million Btu heat input derived from solid fuel (except lignite).

2. When different fuels are burned simultaneously in any combination the applicable standard shall be determined by the following:

II. Emissions from Fuel Burning Equipment (Indirect Heat Exchangers) (Contd.)

$$Y = \frac{x(0.20) + y(0.30) + z(0.70)}{x + y + z}$$

where: Y is the maximum NO_2 emission in lbs per MM BTU heat input.
x is the percent of total heat input derived from gaseous fuel, and
y is the percent of total heat input derived from liquid fuel, and
z is the percent of total heat input derived from solid fuel (except lignite).

III. Emissions from Incinerators

A. Definitions

1. "Auxiliary Fuel" means a substance burned in an incinerator to supply additional heat to attain temperature sufficiently high to dry and ignite waste material and to maintain ignition of the waste but is never in direct contact with it.

B. Particulate Matter

1. The emission rate of particulate matter for incinerators of more than 50 tons per day charging rate shall not be in excess of 0.08 gr/dscf corrected to 12 percent CO_2, excluding the contribution of carbon dioxide from auxiliary fuel.

2. The emission rate of particulate matter for incinerators of 50 tons per day charging rate or less shall not be in excess of 0.2 gr/dscf corrected to 12 percent CO_2, excluding the contribution of carbon dioxide from auxiliary fuel.

IV. Emissions from Storage Vessels for Petroleum Liquids.

A. Affected facilities

1. The provisions of this section shall apply to storage vessels for petroleum liquids having capacities greater than 40,000 gallons, except as provided in subsection 2. below.

2. Storage vessels for petroleum liquids with storage capacity greater than 500 gallons but less than 40,000 gallons shall be equipped with a permanent submerged fill pipe or vapor recovery system.

IV. Emissions from Storage Vessels for Petroleum Liquids (Contd.)

B. Definitions

1. "Storage Vessel" means any tank, reservoir, or container used for the storage of petroleum liquids, but does not include:

   a) Pressure vessels which are designed to operate in excess of fifteen (15) pounds per square inch gauge without emissions to the atmosphere except under emergency conditions.
   b) Subsurface caverns or porous rock reservoirs, or
   c) Underground tanks if the total volume of petroleum liquids added to and taken from a tank annually does not exceed twice the volume of the tank.

2. "Petroleum Liquids" means crude petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Number 2 through Number 6 fuel oils, gas turbine fuel oil Number 26T through 4-GT, or diesel fuel oils Numbers 2-D and 4-D as specified by the Department for Natural Resources and Environmental Protection.

3. "Petroleum Refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, or reforming of unfinished petroleum derivatives.

4. "Submerged fill pipe" means any fill pipe the discharge of which is entirely submerged when the liquid level is six inches above the bottom of the tank; or when applied to a tank which is loaded from the side, shall mean every fill pipe the discharge opening of which is entirely submerged when the liquid level is two times the fill pipe diameter above the bottom of the tank.

C. Hydrocarbon Standard

1. Petroleum liquids in affected facilities shall be stored as follows:

   a) If the true vapor pressure of the petroleum liquid, as stored, is equal to or greater than 1.5 psia but not greater than 11.1 psia, the storage vessel shall be equipped with a floating roof, a vapor recovery system, or their equivalence.

IV. Emissions from Storage Vessels for Petroleum Liquids (Contd.)

b) If the true vapor pressure of the petroleum liquid as stored is greater than 11.1 psia, the storage vessel shall be equipped with a vapor recovery system or its equivalence.

V. Emissions from Petroleum Refineries

A. Affected facilities. The provisions of this section shall apply to fuel gas combustion devices in petroleum refineries only.

B. Definitions

1. "Petroleum Refinery" (see definition at IV.B.3. herein).

"Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

3. "Process Gas" means any gas generated by a petroleum refinery process unit, except fuel gas and process upset gas as defined in this subsection.

4. "Fuel Gas" means any gas which is generated by a petroleum refinery process unit and which is combusted, including any gaseous mixture of natural gas and fuel gas which is combusted.

5. "Fuel Gas Combustion Device" means any equipment, such as process heaters, boilers and flares, used to combust fuel gas but does not include fluid coking unit and fluid catalytic cracking unit incinerator-waste heat boilers or facilities in which gases are combusted to produce sulfur or sulfuric acid.

6. "Process Upset Gas" means any gas generated by a petroleum refinery process unit as a result of a startup, shut-down, upset or malfunction.

C. Sulfur Dioxide (SO_2)

1. No fuel gas containing H_2S in excess of 0.10 gr/dscf shall be burned in any fuel gas combustion device, except as provided in subsection 2. below. The combustion of process upset gas in a flare, or the combustion in a flare of process gas or fuel gas which is released to the flare as a result of relief valve leakage is exempt from this section.

V. Emissions from Petroleum Refineries (Contd.)

2. The owner or operator may elect to treat the gases resulting from the combustion of fuel gas in a manner which limits the release of SO_2 to the atmosphere if it is shown that this prevents SO_2 emissions as effectively as compliance with the requirements of C.1. of this section.

VI. Standards for Oil-effluent Water Separators

A. Affected facilities. This standard shall apply to any compartment of any vessel or device operated for the recovery of oil from effluent water which recovers 200 gallons a day or more of any petroleum products from any equipment which processes, refines, stores or handles hydrocarbons with a Reid vapor pressure of 0.5 lbs or greater.

B. Emission Standard

Emissions of all hydrocarbon vapors and gases shall be reduced by at least 90% (by weight), except when gauging and sampling is taking place.

VII. Standards for Organic Solvents

A. Affected Facilities.

1. This section shall apply to any article, machine, equipment or other contrivance used for employing or applying the following:

a) Any organic solvent which is photochemically reactive or material containing such photochemically reactive solvent.

2. The provisions of this section shall not apply to:

a) The transport, loading, or storage of organic solvents or materials containing organic solvents;
b) The use of any material if the volatile content consists only of non-photochemically reactive solvent comprising not more than 30 percent by volume of the material as applied;
c) The use of any material if the volatile content consists only of water and non-photochemically reactive solvent and the solvent comprises not more than 20 percent of said volatile content by volume as applied;

VII. Standards for Organic Solvents (Contd.)

d) The use of equipment for which other standards are specified by sections IV or VI of this regulation or which are exempt from air pollution control requirements by those sections.

B. Definitions

1. "Organic materials" means chemical compounds of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate.

2. "Organic Solvents" means organic materials which are liquids at standard conditions and which are used as dissolvers, viscosity reducers, cleaning agents, diluents, or thinners.

3. "Photochemically Reactive Solvent" means any solvent with an aggregate of more than 20 percent of its total volume composed of the chemical compounds classified below or which exceeds any of the following individual percentage composition limitations, referred to the total volume of solvent:

a) A combination of hydrocarbons, alcohols, aldehydes, esters, ethers, or ketones having an olefinic or cyclo-olefinic type of unsaturation - five percent;
b) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene - 8 percent;
c) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene - 20 percent.

When any organic solvent or any constituent of an organic solvent may be classified by its chemical structure into more than one of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percent of the total volume of solvents.

C. Standard for Organic Materials

1. It shall be prohibited to discharge into the open air from any affected facility using organic solvents more than 40 pounds of organic materials in any one day nor more than eight pounds in any one hour, unless said emissions have been reduced by at least 85 percent (by weight).

VII. Standards for Organic Solvents (Contd.)

2. Emissions of organic materials into the atmosphere required to be controlled by subsection C.1. shall be reduced by:

   a) Incineration, provided that 90 percent or more of the carbon in the organic material being incinerated is oxidized to carbon dioxide; or
   b) Adsorption; or
   c) Modifying processing procedures, equipment and/or materials in such a manner so as to achieve at least the degree of control of photochemically reactive solvents required herein. The implementation of such modification in lieu of compliance with subsection C.1. requires the express prior approval of the Department.

VIII. Emissions of Hazardous Pollutants

A. Potential Hazardous Emissions. The utmost consideration shall be given to the potential harmful effects of and effective control methods for discharges to the open atmosphere of hazardous matters including, but not limited to, antimony, arsenic, asbestos, beryllium, bismuth, lead, mercury, silica, tin and compounds of such materials. Evaluation of these sources and the control methods designed and proposed will be made on a case-by-case basis by the Department.

KENTUCKY SOLID WASTE REGULATIONS

Basis: Solid Waste Regulations (401 KAR 2:010)

Agency: Department for Natural Resources and Environmental Protection, Bureau of Environmental Quality, Division of Solid Waste.

I. Landfills

A. Permit Requirements

1. A permit to construct and/or operate a landfill is required by the state.
2. Permits may be conditioned upon special limitations not found in this regulation.

B. Location

1. No landfill shall be exposed to a once in five year flood.
2. Landfills subject to a high ground water table shall be restricted to sites which:
    a. provide greater than two feet of compacted earth between deposited solid waste and the maximum water table;

    b. include measures to prevent contamination of ground water; and

    c. provide monitoring facilities.
3. Landfills shall provide not less than two feet of compacted earth between deposited solid waste and bedrock.
4. Landfill locations shall conform to applicable local zoning laws and ordinances.

C. Design Criteria

1. Landfills shall be designed to prevent ground and surface water pollution.
2. Surface contours shall minimize runoff onto or through the operational or completed fill area.

I. Landfills (Contd.)

3. A buffer zone between the fill area and adjacent land shall be provided.

4. Adequate cover shall be available to cover wastes at sufficient intervals.

5. Where stacking of disposal cells is the proposed disposal method, soil stability shall be considered.

II. Sanitary Landfills

A. Special Requirements in addition to those listed above.

1. The plans shall include grades for proper drainage of each lift and a typical cross section of each lift.

2. Cover material shall be of such character that it can be compacted to provide a tight seal.

3. The following improvements shall be made before a sanitary landfill site is placed in operation.

   a. All weather roads shall be provided following improvements.

   b. A shelter for operating personnel shall be provided. The shelter shall be screened and provided with heating facilities and adequate lighting. Safe drinking water shall be available at or near the site.

   c. Fire protection shall be provided.

4. Sanitary landfills shall be in accordance with approved plans.

5. Cover material shall be applied daily.

6. The area shall be graded as frequently as necessary. No surface water shall drain to the fill area.

KENTUCKY SOLID WASTE REGULATIONS

III. Definitions

A. "Landfill" means a solid waste disposal site or facility.

B. "Sanitary landfill" means a landfill at which putrescible and other solid wastes may be disposed.

C. "Solid waste" means all putrescible and non-putrescible refuse in solid form. Solid waste includes but is not limited to garbage, rubbish, ashes, incinerator residue, construction wastes and solid commercial and industrial wastes.

MISSOURI WATER QUALITY CRITERIA

Basis: Missouri Water Quality Standards (June 1973)

Agency: Missouri Clean Water Commission

I. GENERAL CRITERIA APPLICABLE TO ALL STATE WATERS

A. All industrial and mining effluents shall not create conditions in the stream which will adversely affect the present or future water uses.

B. The following minimum water quality conditions shall be applicable to all waters of the state, and such waters shall be:

1. Free from substances that will cause the formation of putrescent or objectionable sludge deposits.
2. Free from floating debris, oil, scum and other floating materials in amounts to be unsightly or deleterious.
3. Free from substances producing color, odor or other conditions to such degree as to create a nuisance.
4. Free from substances that will have a harmful effect on human, animal, or aquatic life.

II. SPECIFIC CRITERIA

A. The following specific water quality criteria shall apply to all classified streams and lakes.

1.

Substance or Condition	Limitation
a. pH	6.5 - 8.5
b. Dissolved Oxygen	5 mg/l
c. Temperature	≤ 90°F

Note: The above listed restrictions are the minimum conditions which may exist at any time due to effluents.

2.

Substance or Condition	Limitation
a. Toxic Substances	None in concentrations or combinations which would be toxic to human, animal, plant or aquatic life.

MISSOURI WATER QUALITY CRITERIA

II. SPECIFIC CRITERIA (CONTD.)

2.	Substance or Condition (Contd.)	Limitation
b.	Bacteria (Fecal coliform count)	* ≤200/100 ml, nor shall more than 10% of total samples during any 30 day period exceed 400/100 ml.
c.	Taste and odor producing sbustances	None which would interfere with the intended use of the water.
d.	Turbidity	None, other than of natural origin.
e.	Color	None, other than natural origin.
f.	Oil and Grease	No residue attributable to waste water, visible oil film, or globules of grease.
g.	Solids	None in amounts to be unsightly or deleterious or will settle to form sludge deposits.
h.	Fluoride (Sources of Potable Water Supply)	≤1.2 mg/l due to effluents or surface runoff.
i.	Undissociated Ammonium Hydroxide (as Nitrogen)	≤0.1 mg/l
j.	Lead	*≤0.1 mg/l
k.	Zinc	≤1 mg/l

* The standards state that these are to be controlled at the limits shown "insofar as possible".

MISSOURI WATER QUALITY CRITERIA

III. EFFLUENT REGULATION (April 1975)

A. Effluents shall meet the best practicable control technology as defined in current effluent limitation guideline documents as prepared by the Federal EPA or the Missouri Clean Water Commission. Where such documents are not available or applicable, the limitations shown below shall be used as the general effluent limitations in establishing permit conditions, and represents the lower level at which the various substances can be removed in a wastewater stream economically with current technology.

Substance	Limitation	
	ug/l	mg/l (Calculated)
Arsenic	100	0.1
Barium	2000	2.0
Beryllium	500	0.5
Cadmium	100	0.1
Chromium - Hexavalent	50	0.05
Trivalent	500	0.50
Copper	1000	1.0
Iron (Suspended or settleable iron, no discoloration at point of discharge)	1000	1.0
Lead	100	0.1
Mercury	10	0.01
Nickel	1000	1.0
Selenium	50	0.05
Silver	100	0.1
Zinc	1000	1.0
Cyanide	50	0.05
Phenols	1000	1.0
Oil and Grease (No visible or floating oil)	<15000	15
Settleable Solids		0.2 ml/l

B. The following limitations apply to percolating water from all areas of land on which wastes or wastewater is allowed to accumulate, whether or not additional treatment is to be obtained by application to the land. Such percolating water shall be considered an effluent to the subsurface waters when it reaches a depth of more than 4 feet.

III. EFFLUENT REGULATION (April 1975) (Contd.)

Substance	Limitation
Arsenic	50 ug/l
Barium	1000 ug/l
Cadmium	30 ug/l
Chromium (Total)	500 ug/l
Copper	20 ug/l
Cyanide	10 ug/l
Fluoride	1200 ug/l
Lead	50 ug/l
Nickel	800 ug/l
Phenols	5 ug/l
Selenium	10 ug/l
Silver	50 ug/l
Zinc	100 ug/l
COD	10 ug/l
Threshold Odor Number (TON)	3
Linear Alkylate Sulfonates	1.0 mg/l
Chlorides	250 mg/l
Sulfates	250 mg/l
Total Dissolved Solids	500 mg/l
Nitrate (as NO_3)	10 mg/l

C. Dilution Prohibited

Dilution of treated wastewater with cooling water or other less contaminated water to lower the concentration to limits required by an effluent regulation shall not be an acceptable means of treatment.

IV. REGULATION FOR THE STORAGE OF HAZARDOUS MATERIALS - (June 1974)

A. Pollution Prevention

1. Any owner or operator of storage facilities for any hazardous materials; such as, but not limited to, petroleum products, fertilizer, pesticides, herbicides, cyanide or cyanogen compounds which are hazardous to health and welfare, or are capable of causing pollution if accident- released, shall locate and construct such facilities so as to prevent any spillage which might result in pollution or damage to a sewer or water treatment facility. Facilities such as catchment areas, relief vessels, or dikes shall be installed to prevent accidental pollution of the state waters.

MISSOURI: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Missouri Air Conservation Commission

I. General Provisions

A. Definitions

1. "Particulate Matter" means any material, except uncombined water, that exists in a finely divided form as a liquid or solid at standard conditions.

2. "Ringelmann Chart" means "Ringelmann's Scale for Grading the Density of Smoke" as published in the U.S. Bureau of Mines Information Circular 8333.

II. Visible Emission Standards

A. General

Maximum Emissions

May not be equal to or darker than:

No. 1 on Ringelmann Chart or an equivalent opacity.

B. Exceptions to A.

1. Visible discharges of less than No. 3 on the Ringelmann Chart or equivalent opacity for periods aggregating not more than six minutes in any sixty minutes will not violate this section.

2. No violation will occur where the presence of uncombined water is the only reason for failure of an emission to meet the standards of this section.

C. Incinerators

Maximum Emissions

May not be equal to or darker than:

No. 1 on Ringelmann Chart or an equivalent opacity.

D. Fugitive Dust. (Airborne Particulate Matter)

1. Definitions

II. Visible Emission Standards (Contd.)

a) "Standard Conditions" for this section shall mean a gas temperature of 60 °F and a gas pressure of 14.7 psia.

2. It shall be prohibited to allow particulate matter to become airborne so that it remains visible in the ambient air beyond the originating source premises or so that its presence may be found beyond said premises and that:

   a) it has particulate matter shown to be larger than 40 microns and
   b) at least one complaint has been filed with the Commission.

3. Reasonable measures shall be used as may be required to prevent particulate matter from becoming airborne so as to remain visible beyond the originating premises where a building or its appurtenances or a road, driveway, or open area is being constructed, used, repaired or demolished. Reasonable measures include, but are not limited to, paving or frequent cleaning of roads and parking lots; application of dust free surfaces; application of water; and the planting and maintenance of vegetative ground cover.

III. Emission Standards for Particulate Matter

A. Emissions from Industrial Processes

1. Definitions

   a) "Process weight" means the total weight of all materials introduced into a source, including solid fuels but excluding liquids and gases used solely as fuels and air introduced for combustion.

2. Maximum allowable emissions*

   a) For process weights up to 60,000 lb/hr, use:

$$E = 4.0P^{0.67}$$

where: E = maximum rate of emission in lb/hr,
P = process weight rate in tons/hr

   b) For process weights in excess of 60,000 lb/hr, use:

$$E = 55.0P^{0.11} - 40$$

where E and P are the same as in a) above

*(see next page)

III. Emissions Standards for Particulate Matter (Contd.)

c) Maximum concentration in exhaust gas

0.30 gr/SCF of exhaust gas

*The limitations of a) and b) in this section may sometimes be relaxed by optional limitation methods based on particulate concentration in the source gas or on a gas volume adjustment and emission limitation in pollution abatement equipment. (Details for these may be found in Regulation S-V, Section D of the Missouri Air Regulations). The concentration limitation in c) of this section must be met regardless of the option used, however.

d) Exceptions. The provisions of A.2 shall not apply during periods when a new fire is being built, during startup or malfunction, or while air pollution control equipment is being repaired or cleaned.

B. Standards for Fugitive Dust (Preventing Airborne Particulate Matter)

1. Definitions. "Particulate Matter" means any material, except uncombined water, existing in a finely divided form as a liquid or solid at standard conditions.

2. Property line limitations

It shall be prohibited to cause or permit the emission of any particulate matter so as to cause concentrations of particulate matter at any inhabited place to exceed any one of the following:

a) Suspended Particulates	80 ug/m^3	6-month geometric mean
(High-Volume Sampler)	200 ug/m^3	2-hour arithmetic average for not less than five two-hour sampling periods within any one year. No more than 3 samples shall be taken during any 24-hour period
b) Soiling Index	p.4Coh/1000 lineal ft.	6 month geometric mean
(AISI Paper tape sampler)	1.0Coh/1000 lineal ft.	8-hour arithemtic average

MISSOURI: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

IV. Standards for Emissions from Fuel Burning Equipment used for Indirect Heating

A. Definitions

1. The "heat input capacity" rating shall be the equipment manufacturer's or the designer's guaranteed maximum input, whichever is greater.

B. Maximum Particulate Emissions

1. Maximum emission, if capacity rating <10 MM Btu/hr

0.60 lbs per MM Btu/hr heat input

2. Maximum emission, if capacity rating >10 MM Btu/hr and < 2000 MM Btu/hr

use formula:

$$\log Y = - .3382 \log X + 2.1454$$

where:

Y is the allowable emissions in lbs/hr
X is the heat input (aggregate heat heat content of all fuels used) in in MM Btu/hr

3. Maximum emission, if capacity rating >2000 MM Btu/hr

0.100 lbs per MM Btu/hr heat input

V. Emission Standards for Incinerators

A. Definitions

1. "Refuse" means garbage, rubbish, trade wastes, leaves, salvageable material, or other wastes.

B. Maximum Particulate Emissions

1. Incinerators with burning capacity >200 lbs/hr

0.2 grains per SCF(Dry) exhaust gas, corrected to 12% CO_2

V. Emission Standards for Incinerators (Contd.)

Incinerators with burning capacity <200 lbs/hr

0.3 grains per SCF(Dry) exhaust gas, corrected to 12% CO_2

C. Other Requirements

1. Incinerators shall be multiple chamber incinerators, provided that the commission may approve any other kind of incinerator shown in advance of installation or construction to be capable of complying with the requirements of this regulation.

VI. Standards for Emissions of Sulfur Compounds

A. General Provisions

1. Where several limitations are applicable to a given emission, the more stringent or restrictive standard shall apply.

B. Standards for Concentration in Emissions

1. Affected facilities. This sub-section B shall apply to all facilities except those in which both:

   a) fuel is burned primarily to produce heat, and

   b) the emission of sulfur compounds is due primarily to sulfur in the fuel burned.

2. Maximum SO_2 concentration in gas emitted

   500 ppm (by vol.)

3. Maximum sulfuric acid or sulfur trioxide (or any combination thereof) concentration in emitted gas stream

   35 mg (expressed as H_2SO_4) per cubic meter of gas emitted

C. Other Limitations on Rate and Manner of Emission

1. Affected facilities. This sub-section C. shall apply to all facilities.

2. SO_2

   Maximum rate of SO_2 Emission

   1000 lbs/hr

VI. Standards for Emissions of Sulfur Compounds (Contd.)

3. Exception to sub-sections C.1 and 2. above:

a) Where SO_2 emissions do not cause or contribute to SO_2 concentrations in the ambient air at any occupied place beyond the emitting source premises exceeding those below for the period and frequency shown:

Maximum SO_2 Concention in Ambient Air*	Time Period Averaged	Maximum Frequency Allowable
.25 ppm (by vol.)	1 hr	once in any 4 day period
.07 ppm (by vol.)	24 hr	once in any 90 day period

*Air at standard conditions

4. Sulfuric acid and sulfur trioxide (SO_3)

Emissions of sulfuric acid and sulfur trioxide (or any combination thereof) from a source such that concentrations attributable to the source in the ambient air in inhabited areas beyond the source premises exceed the values shown on the table below for the frequencies shown shall be prohibited:

Maximum H_2SO_4 or SO_3 Concentration (or any bination thereof) in Ambient Air**	Time Period Averaged	Maximum Frequency Allowable
0.03 mg/m^3	30 minutes	once in any 48 hrs
0.01 mg/m^3	24 hrs	once in any 90 days

**Concentration expressed as H_2SO_4; air at standard conditions.

5. Hydrogen sulfide (H_2S)

Emissions of hydrogen sulfide from a source so that concentrations attributable to the source in the ambient air in any inhabited areas beyond the premises of the source

VI. Standards for Emissions of Sulfur Compounds (Contd.)

exceed the values shown on the table below shall be prohibited:

Maximum H_2S concentration in Ambient Air	Time Period Averaged	Maximum Frequency Allowable
0.03 ppm (by vol.)	30 minutes	twice in any 5 consecutive days
0.05 ppm (by vol.)	30 minutes	twice per year

VII. Standards for Emission of Odors

A. Odorous matter shall not be emitted in such concentrations and frequencies or for such durations that such odor can be perceived when one volume of the odorous air is diluted with seven volumes of odor-free air for two separate trials not less than 15 minutes apart within the period of one hour.

B. Standards for Incinerators

1. Incinerators shall be designed and operated so that all gases, vapors and entrained effluents shall, while passing through the final combustion chamber, be maintained at a sufficient temperature to destroy all odor, provided, however, the Executive Secretary (Missouri Air Conservation Commission) may approve any other method of odor control shown to be equally effective.

VIII. Standards of Performance for New Stationary Sources

A. The Federal regulations for new stationary emission sources (40 CFR, Part 60) are incorporated by reference. The portions of these Federal regulations relevant to this project have been synopsized herein and this synopsis may be found under the "Federal EPA Regulations and Standards" section of this report.

B. The Federal regulations incorporated herein because relevant or partially relevant to fossil-fuel conversion facilities within the scope of this project cover the following listed plants or facilities:

1. Fossil-fuel fired steam generators (40 CFR, Part 60, Subpart D).
2. Incinerators (40 CFR, Part 60, Subpart E).
3. Storage Vessels for Petroleum Liquids (40 CFR, Part 60, Subpart K).

VIII. Standards of Performance for New Stationary Sources

4. Petroleum Refineries (40 CFR, Part 60, Subpart J).

5. Also, proposed Federal regulations covering lignite fired steam generators (will be found in 40 CFR, Part 60, when issued).

C. Where both state limitations herein and Federal regulations incorporated herein are applicable to an emission source, the more stringent standard shall be applied to each emission.

MISSOURI SOLID WASTE RULES AND REGULATIONS

Basis: Missouri Solid Waste Management Law and Missouri Solid Waste Rules and Regulations.

Agency: Missouri Department of Natural Resources, Division of Environmental Quality.

I. Sanitary Landfill

A. Solids Wastes Excluded:

1. Hazardous wastes;
2. Bulk liquids;
3. Semi solids;
4. Sludges containing free moisture;
5. Highly flammable or volatile substances;
6. Pesticides; and
7. Industrial process sludge.

B. Design

1. The wastes to be received shall be determined and names in the plan and the "Application for Operating Permit."
2. The plan shall specify the operating procedures for disposal of the listed wastes.
3. A list of wastes not approved for acceptance shall be displayed at the site entrance.

C. Site Selection

1. Site selection and utilization shall comply with local zoning laws, including a study and evaluation of geologic and hydrologic conditions and soils at the site.
2. Site development plans shall be prepared or approved by a registered professional engineer and shall include:
    a. Land use and zoning within 1/4 mile of the site, including location of all residences,

I. Sanitary Landfill (Contd.)

buildings, wells, water courses, springs, lakes, rock outcroppings, caves, sink-holes and soil or rock borings. All electric, gas, water, sewer and other utility eastments or lines that are located on, under or over the actual disposal site shall be shown on the plans.

b. A map showing initial and proposed topographics at contour intervals of five feet or less.

3. Plans shall describe the projected use of the completed sanitary landfill.

4. The geology and hydrology of the site shall be evaluated in order to design site development in a manner to protect or minimize the impact on surface water and ground water resources. Precipitation, evapotranspiration, and climatological conditions shall be considered in site selection and design.

D. Design Requirement

1. Plans for the design, construction, operation or alteration of the site shall be prepared or approved by a registered professional engineer licensed by the State of Missouri.

E. Water Quality

1. The location, design, construction and operation shall minimize environmental hazards and shall conform to applicable ground and surface water quality standards and requirements.

2. Plans shall include, but are not limited to:

a. Current and projected use of water resources in the potential zone of influence.

b. Provisions for surface water runoff control to minimize infiltration and erosion of cover material. On-site drainage structures and channels should be designed for at least a 20-year rainfall frequency.

MONTANA WATER QUALITY STANDARDS

Basis: Water Quality Standards, MAC 16-2.14(10) - S14480; Montana Pollutant Discharge Elimination Systems, 16-2.14(10) - S14460.

Agency: Montana State Department of Health and Environmental Sciences.

Notes:

1. The Montana water quality standards are composed of water use classifications, water use descriptions and specific water quality criteria, and general water quality criteria.

2. The general water quality criteria apply to all state waters except where specific water quality criteria are more applicable to a specific water use classification.

I. GENERAL WATER QUALITY CRITERIA

A. Minimum Treatment Required

1. Industrial waste is to receive, as a minimum, treatment equivalent to the best practicable control technology currently available (BPCT) as defined by the Environmental Protection Agency (EPA).

2. Where BPCT is not defined by EPA, industrial waste is to receive, after maximum in plant control, a minimum of secondary treatment or equivalent.

B. State surface waters are to be free from substancess attributable to . . . industrial or other discharge that will:

1. Settle to form objectionable sludge deposits or emulsions beneath the surface of the water.

2. Create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 mg/l) or globules of grease or other floating materials.

3. Produce odors, colors or other conditions so as to create a nuisance.

MONTANA WATER QUALITY STANDARDS

I. GENNERAL WATER QUALITY CRITERIA (CONTD.)

4. Create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life.

5. Create conditions which produce undesirable aquatic life.

C. Violation of Standards

1. No wastes are to be discharged or activities conducted such that will violate, or can reasonably be expected to violate, any of the water quality standards.

D. Turbidity

1. No wastes are to be discharged and no activities conducted which will cause turbidities to exceed those allowed by the specific water quality criteria.

   a. Exception - Short term activities such as dredging, channel or bank alterations, stream diversions or other construction may be authorized by the department.

E. Waste Treatment Ponds

1. Ponds for waste treatment purposes are not to be located in drainage ways where the volume of drainage water from a 10-year storm entering the ponds exceeds one-half the volume of the ponds. An exception is noted for emergency oil spills.

F. Mixing Zone

1. Existing discharges to state waters will be entitled to a mixing zone as determined by the department.

G. Dissolved Gases $\leq$110% of saturation

II. EFFLUENT STANDARDS

A. Jurisdiction of the National Pollutant Discharge Elimination System permit in Montana has been transferred from the EPA to the state. Montana establishes specific individual effluent standards by the conditions set forth in this state issued NPDES permit.

II. EFFLUENT STANDARDS (CONTD.)

B. Basis for determining effluent limitations

1. Prohibition of certain discharges without prior approval from the department.

2. Self monitoring requirements for each authorized discharge, including but not limited to the following:

    a. Pollutants to be monitored;

    b. Frequency of monitoring, recording, and reporting;

    c. Analytical and sampling methods to be utilized;

    d. Recording and reporting procedures to be utilized; and

    e. Procedures for reporting other considerations having an effect on authorized discharges or that may effect an authorized discharge, or that may affect any of the conditions of the permit.

3. Requirements for consideration of unusual discharges, including but not limited to the following:

    a. Reporting procedures for accidental discharges, plant bypasses, plant upsets, and discharge of oil and hazardous materials; and

    b. Where applicable required submittal of an acceptable oil and hazardous materials spill prevention and containment plan.

MONTANA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

Agency: Air Quality Bureau, Environmental Science Division, Montana Department of Health and Environmental Sciences

I. General Provisions

A. Definitions

1. "Fuel burning equipment" means any furnace, boiler apparatus, stack, or appurtenances thereto used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer.

2. "Installation" means any property, real or personal, including, but not limited to, processing equipment, manufacturing equipment, or construction, capable of creating or causing emissions.

3. "Particulate matter" means any material, except water in uncombined form, that is or has been airborne, and exists as a liquid or a solid at standard conditions.

4. "Ringelmann Smoke Chart" means the chart published and described in the latest applicable U. S. Bureau of Mines Information Circular, used in estimating the light obscuring power of smoke.

II. Visible Emission Standards

A. Maximum Emissions - Any Installation
No. 2 on Ringelmann Chart, or equivalent opacity

B. Maximum Emissions - Any Single Source
No. 1 on Ringelmann Chart, or equivalent opacity

C. Exceptions to A. and B.

1. The above limitations do not apply where the presence of uncombined water is the only reason for failure of an emission to meet such limitations.

2. The limitations of A. and B. above shall not apply to emissions during the building of a new fire, soot blowing, or building a new fire if the emission shade or density is less than No. 3 on the Ringelmann Chart for periods aggregating four minutes or less in any 60 minutes.

D. Incinerators

1. Maximum Emissions
No. 1/ 2 on Ringelmann Chart, or 10% Opacity

MONTANA: STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

III. Emission Standards for Fugitive Dust

A. It shall be prohibited to handle, transport, or store any material in such a manner as to allow controllable particulate matter to become airborne.

B. It shall be prohibited to cause or allow a building or its appurtenances, or a road, driveway or open area to be constructed, used, repaired or demolished without applying all such reasonable measures as may be required to prevent particulate matter from becoming airborne. Reasonable measures include, but are not limited to, paving, or frequent cleaning of roads, driveways or parking lots, application of dust-free surfaces, application of water, and the planting and maintaining of vegetative ground cover.

IV. Emission Standards for Particulate Matter

A. Definitions

1. "Process weight" means the total weight of all materials introduced into any specific process which may cause emissions. Solid fuels charged will be considered as part of the process weight, but liquid and gaseous fuels and combustion air will not.

B. Industrial Processes

1. Affected facilities: All industrial processes but not including:

   a) fuel burning equipment
   b) incinerators
   c) new stationary sources as covered in Section IX herein for which particulate emission standards have been promulgated

2. Maximum Emissions

   Use the formulae as follows:

   $\leq$ 60,000 lb/hr process weights

   $$E = 4.10P^{0.67}$$

   $>$ 60,000 lb/hr process weights

   $$E = 55.0P^{0.11} - 40$$

   where (in both formulae above):
   E = maximum rate of emission in lb/hr; and
   P = process weight rate in T/hr

IV. Emission Standards for Particulate Matter (Contd.)

C. Fuel Burning Equipment

1. Maximum Emission

$\leq$10 MM Btu/hr heat input: 0.60 lb/MM Btu heat input

>10 MM Btu/hr heat input:

use $E = 1.026X^{-0.233}$

[Formula not in written regulations - received from Montana Bureau by telephone].

where: E is maximum rate of emission in lb/MM Btu heat input; and
X is heat input in MM Btu/hr.

2. Heat input in C.1. above shall be calculated as the aggregate heat content of all fuels (using upper limit of their heating value range) whose products of combustion pass through a stack or chimney.

D. Incinerators

1. Maximum Emission
0.10 gr/ DSCF of flue gas, corrected to 12% CO_2 amd calculated as if no auxiliary fuel had been used

2. No incinerator shall be used for the burning of refuse unless such incinerator is of the multiple chamber type or other design of equal effectiveness for air pollution control purposes and approved by the administrator prior to construction or installation.

V. Emission Standards for Sulfur Oxides

A. Standards for Sulfur (S) Content of Fuels

1. Liquid or Solid Fuels

a) Maximum S in fuel: 1 lb/MM Btu fired

2. Gaseous Fuels

a) Maximum S in fuel (S calculated as H_2S):
50 gr/ 100SCF of gaseous fuel

3. Exemptions as to A.1. and A.2. above:

a) Incineration of waste gases where:
i) gross heating value of waste gases is less than 300 Btu/SCF; and

V. Emission Standards for Sulfur Oxides (Contd.)

ii) the fuel used for firing does not contain sulfur compounds in excess of the limitations of A.1. or A.2. above.

b) Facilities in which the gaseous products of combustion are used as raw materials in processes.

c) Small refineries of under 10,000 barrels per day crude oil charge.

4. Exceptions

a) Facilities firing at a rate of 1 MM Btu/hr or less may burn fuels that are not within the sulfur requirements above with proper approval.

b) Fuels containing higher sulfur contents than allowed herein may be used with proper approval where such fuels are mixed with one or more lower sulfur-containing fuels so that the resultant mixture has an equivalent sulfur content not in excess of the standards in this section.

c) Sulfur dioxide control as to the emission gases may be used as an alternate to the requirements in this section upon approval if it can be shown that the sulfur emissions in lb/hr with such control will not exceed the amount that would be emitted were fuel within the sulfur content limitations herein to be used.

VI. Standards for Odors

A. General Prohibitions

1. It shall be prohibited to cause or allow the discharge of gases, vapors, or odors beyond the property line of a source so that a public nuisance is created.

2. It shall be prohibited to operate any business or use any machine, equipment, device, facility or process discharging into the atmosphere any odorous matter or vapors, gases, dusts, or combination thereof which create odors without providing and maintaining such odor control devices, systems, or procedures as may be specified by the administrator.

B. Handling and Storage Limitations

1. Odor producing materials shall be stored and handled so that accompanying odors do not create a public nuisance; accumulation of such quantities of these materials as to permit their escape or spillage shall be prohibited.

VI. Standards for Odors (Contd.)

2. Odor bearing gases, vapors, fumes, or dusts arising from materials in-process shall be confined at the point of origin and/or treated before discharge to the atmosphere to prevent liberation of odorous matter.

VII. Fluoride Emission Standards

A. Phosphate, phosphorite, or phosphorous processing equipment and other fluoride processing or treating equipment.

1. Affected facilities: any phosphate rock or phosphorite processing equipment, equipment used in the production of elemental phosphorous, enriched phosphate, phosphoric acid, defluorinated phosphate or phosphate concentrate, or equipment processing fluorides enriched wastewater, fluorides in a gaseous or particulate form or combinations thereof.

2. Maximum Emissions (of fluorides in particulate or gaseous form or a combination thereof)

0.3 lb/T of P_2O_5 5 introduced into a process capable of releasing applicable fluorides

B. Pond Emission Standards

1. It shall be prohibited to cause or allow the emission of fluorides from any storage pond, settling basin, ditch, liquid holding or conveying tank or device associated with the affected facilities described in A.1. above in excess of:
108 ug/cm^2/28 days (using calcium formate paper determination method)

VIII. Standards for Organic Liquids (Petroleum Products)

A. Storage and Handling

[Montana has incorporated by reference certain of the Federal regulations for new stationary emission sources (40CFR, Part 60). Among these is "Storage Vessels for Petroleum Liquids" (40CFR, Part 60, Subpart K) which has standards for this subtopic. See Section IX herein and "Federal EPA Regulations and Standards" part of this report for details].

B. Oil-water Separators

VIII. Standards for Organic Liquids (Petroleum Products) (Contd.)

1. It shall be prohibited to use any compartment of any single or multiple compartment oil-effluent water separator which compartment receives effluent water containing 200 gallons a day or more of any petroleum product of equal or greater volatility than kerosene, unless such compartment is equipped with one of the following vapor loss control devices constructed so as to prevent any emission of hydrocarbon vapors to the atmosphere.

   a) A solid cover with all openings sealed and totaly enclosing the liquid contents. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.
   b) A floating roof, consisting of a pontoon type or double-deck type roof, resting on the surface of the liquid contents and equipped with a closure seal or seals to close the space between the roof edge and containment wall. All gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.
   c) A vapor recovery system, consisting of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere. All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.
   d) Other equipment of equal efficiency provided such equipment has been approved by the administrator.

C. Loading

1. It shall be prohibited to load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is capable of maintaining working pressures sufficient at all times to prevent hydrocarbon vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices:

   a) A floating roof, consisting of a pontoon type or double-deck type roof, resting on the surface of the liquid contents and equipped with a closure seal or seals to close space between the roof edge and tank wall. The control equipment provided for in this paragraph shall not be used if the

II. Standards for Organic Liquids (Petroleum Products) (Contd.)

gasoline or petroleum distillate has a vapor pressure of 13.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

b) A vapor recovery system, consisting of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission to the atmosphere. All tank gauging and sampling devices shall be gas-tight except when gauging or sampling is taking place.

c) Other equipment of equal efficiency provided such equipment has been approved by the administrator.

IX. Standards for New Stationary Sources

A. Certain Federal regulations for new stationary emission sources (40 CFR, Part 60) are incorporated by reference. The regulations incorporated which are relevant to this project are listed in B. below. The relevant portions of these regulations have been synopsized herein and this synopsis may be found under the "Federal EPA Regulations and Standards" section of this report.

B. The Federal regulations incorporated herein because relevant or partially relevant to fossil-fuel conversion facilities within the scope of this project cover the following listed plants or facilities:

1. Fossil-fuel fired steam generators (40 CFR, Part 60, Subpart D.).
2. Incinerators (40 CFR, Part 60, Subpart E).
3. Storage Vessels for Petroleum Liquids (40 CFR, Part 60, Subpart K).
4. Petroleum Refineries (40 CFR, Part 60, Subpart J).

MONTANTA SOLID WASTE REGULATIONS

Basis: State Senate Bills 175 and 200

Agency: Department of Health and Environment Sciences, Solid Waste Management Bureau

The Montana State Legislature has enacted two new laws, Senate Bills 175 and 200, respectively titled, "Solid Waste Management Act" and "Montana Solid Waste Management Act." Part of Senate Bill 175 requires that a state solid waste management plan be prepared taking into account public comment.

The Montana Department of Health and Environmental Sciences has stated that the draft state plan was compiled to meet the requirements not only of state law but also of the federal law (The Recource Conservation and Recovery Act of 1975). The state plan establishes the means for local and areawide planning to be initiated and financial assistance provided for these efforts.

The following rule, as of May 1977, is proposed under the Montana Solid Waste Management Act. The highlights of this proposed rule are as follows:

Rule MAC____________(May 1977)
Montana Solid Waste Management Act.

I. Waste Classification

A. Group I wastes include but are not limited to:

1. Wastes identified by EPA as hazardous wastes;
2. Brines, caustics, acids, industrial process wastes and liquid synthetic organic chemicals;
3. Oil, petroleum wastes and waste sediments or sludges from petroleum products.

II. Solid Waste Disposal Site Classification

A. Class I sites may accept Group I, II and III wastes; and

MONTANTA SOLID WASTE REGULATIONS

II. Solid Waste Disposal Site Classification (Contd.)

1. Shall not allow the discharge of these materials or their by-products to ground or surface water; and

2. Confine the wastes to disposal site or must be situated in a location where the leachate from the wastes can only percolate into underlying formations which have no hydraulic continuity with ground or surface waters.

B. Approval Required - Class I Sites

1. Maintenance and operation plan, design, and location shall be approved by the department.

III. Class I Solid Waste Disposal Site

A. The site shall be fenced.

B. The site shall t strictly supervised during open hours.

C. Burning of solid waste at a Class I disposal site is prohibited unless a variance in writing is granted.

D. Dumping of solid waste shall be confined to an area which can be effectively maintained and operated in accordance with this rule.

E. Group I waste at a Class I disposal site shall be covered with a minimum of twelve (12) inches of suitable earth after each operating day, unless an exemption is granted.

IV. Hazardous Wastes

A. Identification of Hazardous Wastes

1. Any solid waste or combination of solid wastes shall be termed a hazardous waste if so classified by the EPA.

B. Generation of Hazardous Wastes

1. No person may consign hazardous wastes to another person without the disclosure of the hazardous nature of the solid waste.

MONTANTA SOLID WASTE REGULATIONS

IV. Hazardous Wastes (Contd.)

2. The department may require the submission of reports from persons who generate hazardous wastes, regarding the types, quantities, composition and disposition of such wastes.

3. Not later than ninety (90) days after the promulgation by EPA of rules identifying hazardous wastes, any person who generates hazardous wastes shall file notification with the department stating the location and general description of the waste generating facility and the hazardous wastes produced at such facility.

4. The department may require persons who generate hazardous wastes to maintain pertinent records, including copies of waste manifests, for specified periods of time.

5. Beginning six (6) months after the EPA adopts rules applicable to the generation of hazardous wastes, no person who generates hazardous wastes may place such wastes in containers except as allowed under EPA rules, amy place such wastes in unlabeled or improperly labeled containers, or may consign a shipment of hazardous wastes to another person without initiating a waste manifest.